Communication Description
IM/265/7/9/ADD/FF-EN_01

Series 2600T Pressure Transmitters
Connection to FOUNDATION Fieldbus

For pressure, differential pressure, level, and pressure/temperature-corrected flow measurement

Communication description for FOUNDATION Fieldbus

- Valid for models 265Dx, 265VS, 265Gx, 265Ax, 267JS, 267Cx, 269JS, 269Cx

Fieldbus Foundation

ABB

Series 2600T Pressure Transmitters
Connection to FOUNDATION Fieldbus

Communication Description

IM/265/7/9/ADD/FF-EN_01

05.2009

Manufacturer:

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1 Preamble

In order to make easier the description, all the variables mentioned in this document are written with the suffix RB or TB or AIFB or PID indicating the block into where the variables are mapped.

2 Acronyms

Acronym	Meaning
LCD	**L**iquid **C**rystal **D**isplay
CPU	**C**ontrol **P**rocess **U**nit
DSP	**D**igital **S**ignal **P**rocessing
H1	Low Speed Fieldbus Segment
FF	**F**OUNDATION **F**ieldbus
LAS	**L**ink **A**ctive **S**cheduler
AIFB	**A**nalog **I**nput **F**unction **B**lock
RB	**R**esource **B**lock
TB	**T**ransducer **B**lock
AOFB	**A**nalog **O**utput **F**unction **B**lock
PIDFB	**P**roportional **I**ntegral **D**erivative **F**unction **B**lock
MVFB	**M**ulti **V**ariable **F**unction **B**lock
DD	**D**evice **D**escription
CFF	**C**apability **F**ile **F**ormat
IS	**I**ntrinsically **S**afety
FISCO	**F**ieldbus **IS** **Co**ncept
OOS	**O**ut **O**f **S**ervice

3 FOUNDATION Fieldbus Definition

FOUNDATION™ Fieldbus is an all-digital, serial, two-way communication system that serves as a Local Area Network (LAN) for factory/plant instrumentation and control devices.

FOUNDATION™ Fieldbus is designed to be compatible with the officially sanctioned SP50 standards project of the ISA (The International Society for Measurement and Control) and the specifications of the IEC (International Electrotechnical Committee.

A unique characteristic of FOUNDATION™ Fieldbus is interoperability that ensures its use of a fully specified, standard User Layer based on "Blocks" and Device Description technology.

Detailed information of the FOUNDATION™ Fieldbus is available read on the Webpage of the FIELDBUS FOUNDATION (www.fieldbus.org) and / or from the ABB Webpage (www.abb.com).

4 Device Introduction

4.1 General considerations

The 2600T Pressure Transmitter Series include a complete line of differential, absolute and gauge pressure transmitters used also for level, flow and volume applications.

In addition, 2600T Series offers the most complete line of remote seal forms and wetted materials in the industry; different process and application matching fill fluids cover the widest process temperature range.

The series is covered by multiple agency safety approvals (including ATEX and FM) supported by intrinsically safe and explosion proof designs, for a full compliance to hazardous area requirements.

4.2 FOUNDATION™ Fieldbus Version Considerations

The models 265 / 267 / 269 FOUNDATION™ Fieldbus version differs by the traditional 4 … 20 mA version only in the secondary electronic and in the Terminal block. The transducer with its own primary electronic has to be considered the common part of all the different Transmitter versions (HART, PROFIBUS and FF). This feature offers the possibility to replace on the same transmitters different electronics with the plug and play capability.

The models 265 / 267 / 269 FOUNDATION Fieldbus Revision 2 implements and is compliant to the communication Protocol FOUNDATION™ Fieldbus specification version 1.5.

The models 265 / 267 / 269 FF Revision 2 is registered as a Link Master Device. When the models 265 / 267 / 269 FF is properly configured as back-up LAS, if the current LAS running in the controller fails, it enables its own LAS functionality with the task to maintain alive the Fieldbus operations.

The models 265 FF Revision 2 includes:

- 1 Standard Resource Block
- 2 Standard Analog Input Function Blocks
- 1 Standard PID Function Block
- 1 Custom Pressure with Calibration Transducer Block

The models 267 / 269 FF Revision 2 includes:

- 1 Standard Resource Block
- 3 Standard Analog Input Function Blocks
- 1 Standard PID Function Block
- 1 Custom Pressure with Calibration Transducer Block
- 1 Temperature Transducer Block
- 1 Multi Variable Function Block

Here is a summary of the FF functionality implemented in the models 265 / 267 / 269 FF:

- **Client / Server VCR**

  This communication type is used for the operator messages like read / write of configurations or maintenance data. This is a not scheduled message but executed when the operator requires it.

- **Publisher / subscriber VCR**

  This communication type is used for Process Control purpose. These are the scheduled and cyclic exchange of data.

- **Report / Distribution VCR**

  This communication type is used when the slave device has to advise the operator consoles about the occurrence of alarms (Event Notification) or for Trend report.

- **LAS Functionality**

  With this functionality the models 265 / 267 / 269 FF can acts as backup master, keeping alive the Function block application whenever the Master/Controller fails.

  The LAS implemented in the device supports 1 sub-schedule, 25 sequences and 25 elements for sequence.

- **1 Enhanced Resource Block**

  This block identifies the transmitter and includes characteristics of the instrument connected at the Fieldbus like Model, Serial Number, Manufacturer and so on. Only 1 Resource Block can be present in each device.

- **1 … 3 Standard Analog Input Function Block**

  These blocks are for the Out Values and Status of Pressure or Differential Pressure, Static Pressure with Differential Pressure transmitters and Process Temperature for Multi Variable Transmitters.

- **Standard Proportional Integral Derivative Function Block**

  Inside the Function blocks (AI, PID) are contained the information/parameters relating the Process Control. Each Function Block type provides specific functionality. The combination of different Function Blocks offers the possibility to design a complete control loop.

- **1 Multi Variable Function Block (only with 267 / 269)**

  The Multi Variable Function blocks are contained the parameters relating to the flow calculation.

- **1 Custom Pressure with Calibration Transducer Block**

  In this block are contained the information relating the models 265 / 267 / 269 sensor like Model, Calibration, Physical Limits or Construction, and setting about how to convert the measured Pressure to Flow, Level or Volume measurement.

- **1 Custom Temperature with Calibration Transducer Block (only with 267 / 269)**

  In this block are contained the information relating the models 267 / 269 external Pt100 sensor.

- **FMS services supported:**
  - Initiate
  - Abort
  - Status
  - Identify
  - Read Variable
  - Write Variable
  - Get Object Dictionary

- **Link objects mechanism.**

  This allows the linking between the produced Values or Alarms or Trends in output from the AIFBs (Publisher) with other Input Blocks enabled to receive these information (Subscriber).

  I.e. Pressure in output from AIFB, linked as input for PIDFB.

- **Event Notification mechanism.**

  This provides to automatically send an alarm message to the Master whenever an alarm or event condition occurs. This message includes details about when the event occurred (date, time) and about the reason of the event or alarm (subcode).

- **Trend Objects.**

  These objects collect a defined number of sampling of a selected variable, under different conditions.

4.3 Registration Details

- **DEVICE**

Model:	2600T Series- Models 263 / 265
Type:	Pressure Transmitter
Revision:	2
Tested Function Blocks:	3 x AI (Standard), 1 x PID (Standard), 1 x RB (Enhanced)
Other Blocks:	1 x TB (Custom)
Comm. Profile Class:	31PS, 32L
IT Campaign Number:	IT023600

- **PHYSICAL LAYER**

Class:	111, 113, 121, 123, 511

- **DEVICE DESCRIPTION**

Manufacturer ID Num:	0x00320
Device Type:	0x0089
DD Revision:	0x01

- **CAPABILITY FILE**

Filename:	020101.cff

FIELDBUS FOUNDATION
DEVICE
REGISTRATION

FOUNDATION

Presented To:	ABB Automation Products Gmbh
Model:	2600T Series 263/265
Device Type:	Pressure Transmitter
ITK_Ver:	4
IT Campaign Number:	IT023600
Registration Date:	1/13/2004
DD Revision:	0x01
CFF Revision:	020101.cff

The above device has successfully completed rigorous testing by the Fieldbus Foundation and has received registration and the right to use the FF checkmark logo as specified by MT-045.

Heather Cannard
Test Technician

Richard J Timoney
President

FIELDBUS FOUNDATION
DD/CF
REGISTRATION

FOUNDATION

Presented To:	ABB Automation Products GmbH	
Name:	2600T Series	
Model:	263/265	
Device Type:	0x0089	
Device Revision:	0x02	
Original Interoperability Test Campaign:	IT023600	
Device Description:	0201.FFO	(CRC32:5D9C17F2)
:	0201.SYM	(CRC32:88039A23)
Capabilities File:	020102.CFF	(CRC32:F48F2AB3)
ITK Version:	4.60	
DD/CF Test Campaign Number:	IT028902	
DD/CF Re-Registration Date:	11/4/2004	

The above device has successfully completed rigorous testing by the Fieldbus Foundation and has received registration and the right to use the FF checkmark logo as specified by MT-045.

Heather Cannard
Test Technician

Richard J Timoney
President

- **DEVICE**

Model:	2600T Series- Models 267 / 269
Type:	Multivariable Transmitter
Revision:	2
Tested Function Blocks:	3 x AI (Standard), 1 x PID (Standard), 1 x RB (Enhanced)
Other Blocks:	2 x TB (Custom), 1 x MV (Custom)
Comm. Profile Class:	31PS, 32L
IT Campaign Number:	IT023700

- **PHYSICAL LAYER**

Class:	111, 113, 121, 123, 511

- **DEVICE DESCRIPTION**

Manufacturer ID Num:	0x00320
Device Type:	0x008A
DD Revision:	0x01

- **CAPABILITY FILE**

Filename:	020101.cff

FIELDBUS FOUNDATION
DEVICE
REGISTRATION

FOUNDATION

Presented To:	ABB Automation Products Gmbh
Model:	2600T Series 267/269
Device Type:	Pressure Transmitter
ITK_Ver:	4
IT Campaign Number:	IT023700
Registration Date:	1/13/2004
DD Revision:	0x01
CFF Revision:	020101.cff

The above device has successfully completed rigorous testing by the Fieldbus Foundation and has received registration and the right to use the FF checkmark logo as specified by MT-045.

Heather Cannard
Test Technician

Richard J. Timoney
President

FIELDBUS FOUNDATION
DD/CF
REGISTRATION

FOUNDATION

Presented To:	ABB Automation Products GmbH	
Name:	2600T Series	
Model:	267/269	
Device Type:	0x008A	
Device Revision:	0x02	
Original Interoperability Test Campaign:	IT023700	
Device Description:	0201.FFO	(CRC32:274AEFF5)
:	0201.SYM	(CRC32:88039A23)
Capabilities File:	020102.CFF	(CRC32:4DD404D)
ITK Version:	4.60	
DD/CF Test Campaign Number:	IT028901	
DD/CF Re-Registration Date:	11/4/2004	

The above device has successfully completed rigorous testing by the Fieldbus Foundation and has received registration and the right to use the FF checkmark logo as specified by MT-045.

Heather Cannard
Test Technician

Richard J. Timoney
President

5 Hardware Characteristics

5.1 Current limitation

This electronic implements also an especial circuitry for the current limitation. Whenever a fatal failure occurs and the current consumption increase over the 19 mA, this circuitry provides a limitation of the current to 19 mA, in order to save the good functionality of the other connected devices that otherwise would be switched off due to the missing power available.

5.2 Local Display

The 2600T FF Pressure Transmitter is available with an integral display as optionally item, see Fig. 1. This integral display offers the possibility to display the selected variable or diagnostic strings whenever failure and / or warnings are detected.

The variable to be displayed is user selectable among several variables produced in the TB as well as the Function Blocks output in Engineering Value, or its percentage. It is selected writing the right code in the RB_METER_OPTION. See the Ressource Block table in **10.2 Resource Block**.

- If the transmitter works correctly, the variable selected in the RB_METER_OPTION is displayed together with the unit code, and it is updated periodically. If the value is too high to show, “OVERFLOW” is displayed.
- When some malfunctions are detected, on the display appears the following diagnostic string sequences: “ALARM”.

The first column of the second row shows some special characters in cyclic order. These characters are the number of the shown value, write protection, transfer function, status available and EEPROM burning active.

Below the displayed value is a percent bar. The value there displayed is the OUT value of the AI1 FB at normal transmitters or the mass flow (norm volume flow) at multivariable transmitters.

The display acts also as feedback of the operations performed with the external push buttons, for additional display indications see the "structure tree" on page 15.

Fig. 1: Integral local display

5.3 Local Keys

Three external push buttons are available, see the Fig. 2. To make the keys accessible, release the screw and turn the protection cap aside.

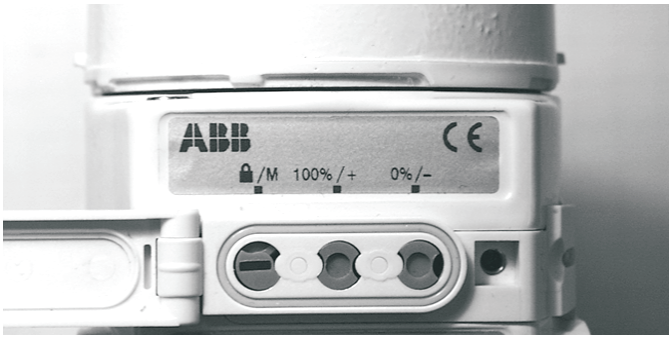


Fig. 2: Push Buttons View

Simulation:

The simulation can be activated as follows (see also symbolism on the plate).

1. First, fully press down the mode key "M" with an appropriate screwdriver.
2. Then turn the switch clockwise by 90° angle.

For deactivation, the switch has to be pushed down a little and turned counter clockwise by 90° angle.

Without display:

The "-" / "+" keys have the same function like TB_SET_LOWER_RANGE and TB_SET_UPPER_RANGE. The mode key "M" enables / disables the simulation mode.

With display:

With the mode key "M", you can start menu-controlled programming. To call the next menu item, press the key "+". You will return via the key "- ". Submenu items / selection lists are activated via the mode key "M". A numerical value can only be changed via the keys "+" and " - ". It must be taken into account that the key "+" changes the value (each keystroke increases the value by 1), whereas the position of the value to be changed is reached via the key " - ". Acknowledge changes with the mode key "M"; the subsequent OK acknowledgement (via the key "M", "+" or "-") writes the new value into the failsafe storage. An adjusting process can be aborted by pressing simultaneously the keys "+" and "-". From any main menu item, you can return to the menu item "EXIT" by simultaneously pressing the "+" and "-" keys. When the adjustment has been finished, quit the program via the menu item "EXIT".

By means of the following structure tree, you will get an overview of the selection / programming possibilities.

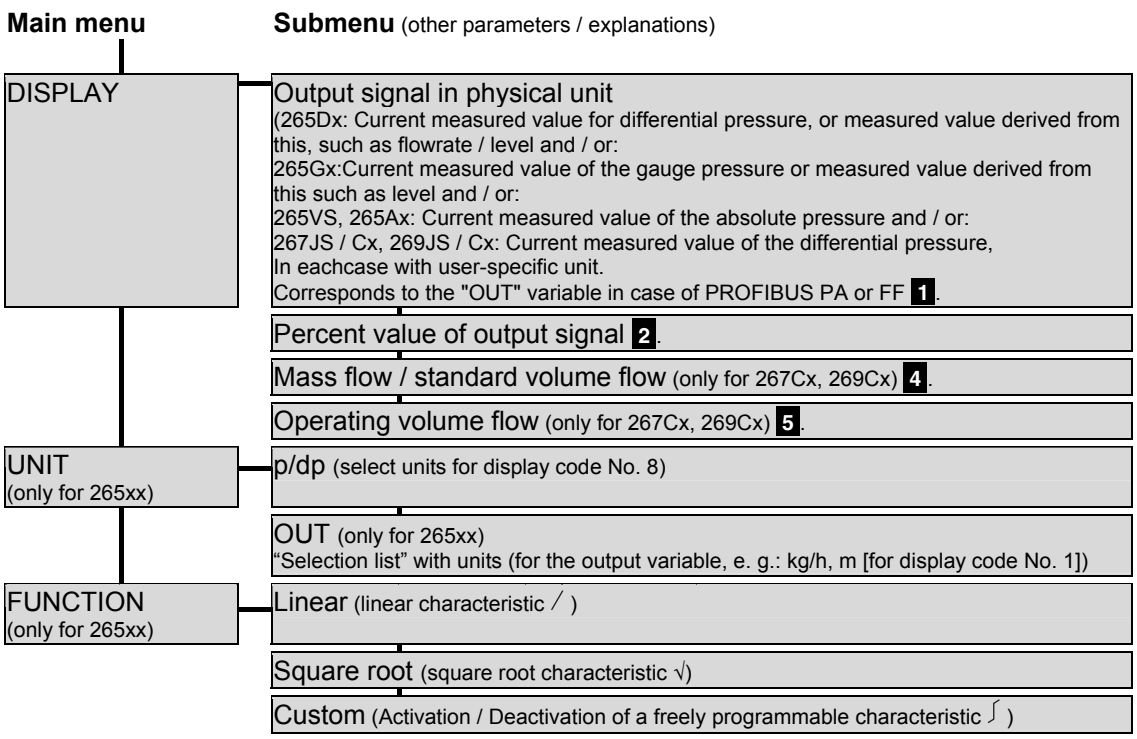
5.4 Structure tree

The menu is called up using the mode button "M".

Important

The numbers displayed inversely (**1** to **9**) specify the code for the display value. These numbers are shown on the 2nd line of the display, on the left-hand side.

Main menu	Submenu (other parameters / explanations)
EXIT	
VIEW (Temporary display of display values **1** to **9**)	Output signal in physical unit (265Dx: Current measured value for differential pressure, or measured value derived from this, such as flowrate / level and / or: 265Gx:Current measured value of the gauge pressure or measured value derived from this such as level and / or: 265VS, 265Ax: Current measured value of the absolute pressure and / or: 267JS / Cx, 269JS / Cx: Current measured value of the differential pressure, In eachcase with user-specific unit. Corresponds to the "OUT" variable in case of PROFIBUS PA or FF **1**.
	Percent value of output signal **2**.
	Mass flow / standard volume flow (only for 267Cx, 269Cx) **4**.
	Operating volume flow (only for 267Cx, 269Cx) **5**.
	Static pressure (only with differential pressure transmitters) **6**.
	Process temperature (only with 267JS / Cx, 269JS / Cx, displays the temperature of the Pt100) **7**.
	Pressure / differential pressure **8**.
	Sensor temperature **9**.
GET 0 %	Setting with applied pressure (only for 265xx)
GET 100 %	Setting with applied pressure (only for 265xx)
SET 0 %	Setting without applied pressure (only for 265xx)
SET 100 %	Setting without applied pressure (only for 265xx)
SHIFT ZERO	Sensor misalignment / zero correction
OFFSET SHIFT	Parallel shift (only for 265xx)
OUT 0 %	Setting of output variable (only for 265xx)
OUT 100 %	Setting of output variable (only for 265xx)
DAMPING	



Units of the parameter „UNIT -> p/dp“

- Pa
- GPa
- MPa
- KPa
- mPa
- uPa
- HPa
- bar
- mbar
- Torr
- Atm
- psi
- g/cm^2
- kg/cm^2
- in H_2O
- mm H_2O
- ft H_2O
- in Hg
- mm Hg

6 Network Architecture

A simple generic FOUNDATION™ Fieldbus system is represented in Fig. 3. The H1 segment is applicable in Ex and non Ex area. The network can be designed following three different topologies as shown in the Fig. 4 below or can be applied as a mix of the three.

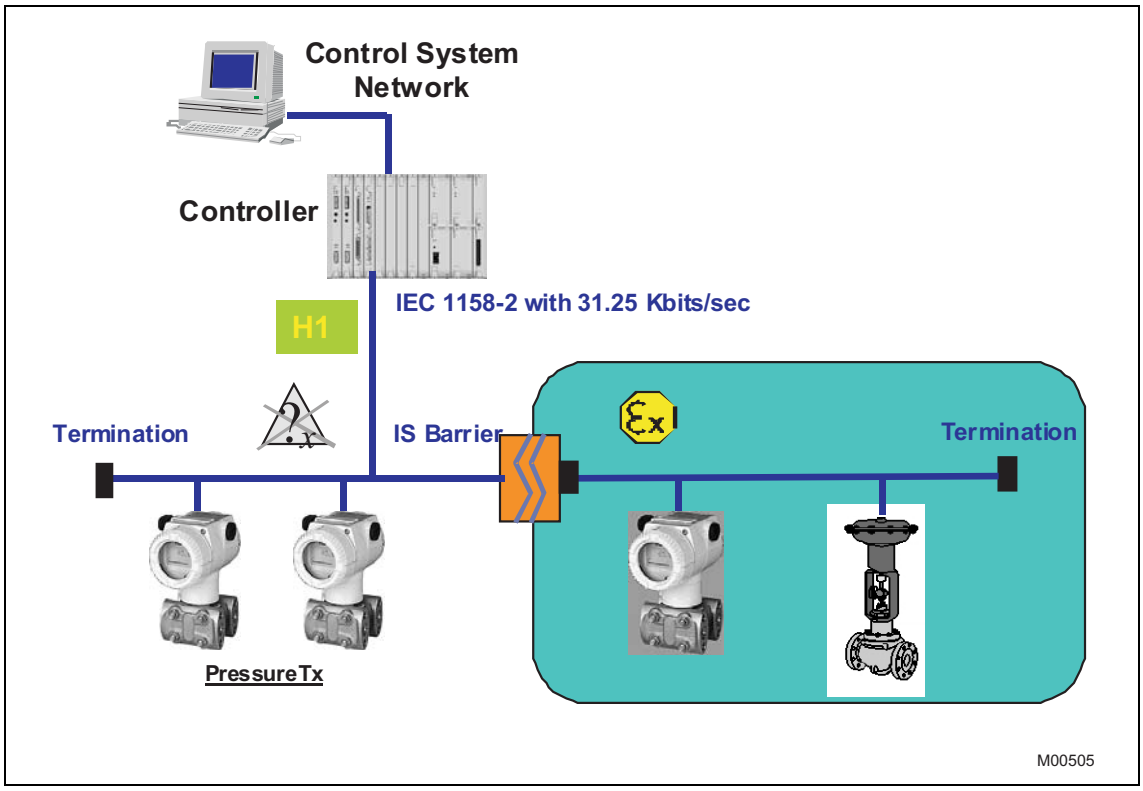


Fig. 3: Simple FOUNDATION Fieldbus system

Important

The controller in this Figure acts also as power supply.

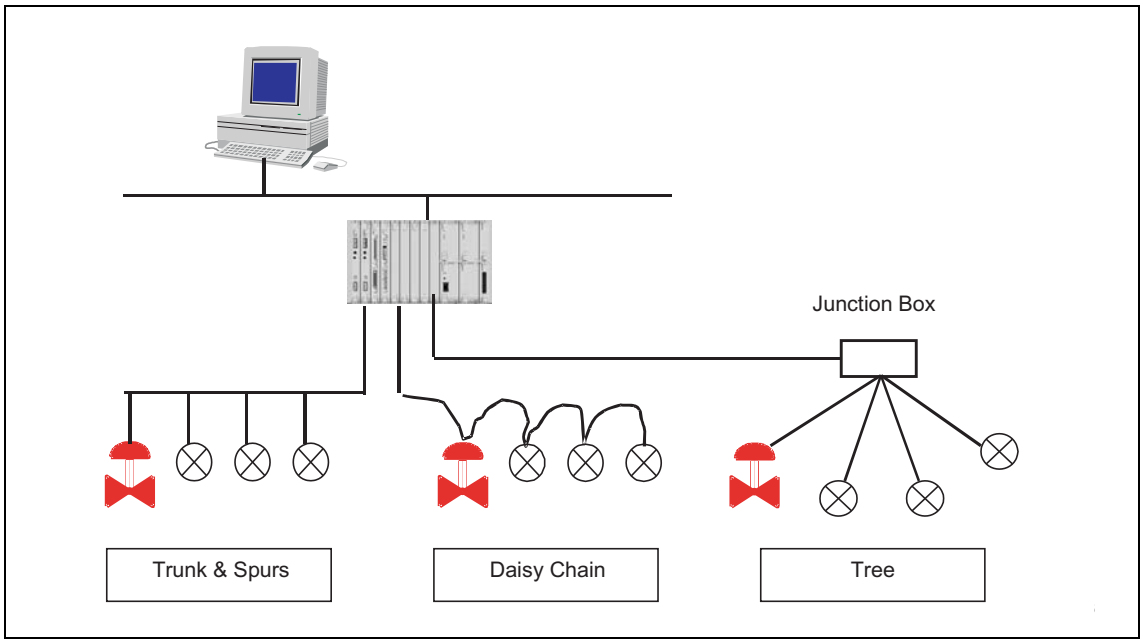


Fig. 4: Fieldbus topologies

Some summarised Fieldbus characteristics.

Parameters	Specifications	
Data rate	31.25 Kbits/s	
Type	Voltage	
Topology	Bus / Tree	
Bus power	DC	
Intrinsically safe	No	Yes
Max number of devices (1)	32	6
Max cable length (2)	1900 m	
Max spurs length (3)	120 m	

1) The number of devices is strictly dependent by factors like the device power consumption, Type of cable used, additionally accessory devices such as repeaters and so on.

2) The maximum length includes the bus plus all the spurs length. The cable Type 'A' (# 18 AWG (0.8 mm^2)) twisted pairs cable allows the maximum length of 1900 m.

3) The maximum Spur length is 120 m when only one device is connected. Any additional device reduces of 30 m the maximum Spur length.

The models 265 / 267 / 269 FF have the following power requirements:

- Current consumption = 12 mA
- Power Supply non-Ex = 10.2 … 32 V DC

A typical ABB Solution for FOUNDATION Fieldbus is represented in the Fig. 5.

The number of models 265 / 267 / 269 FF transmitters connected on one segment for EEx ia applications can be increased when used in conjunction with the ABB Multibarrier NMB204-EX.

It is possible to connect up to eight Multibarriers NMB204-Ex on one EEx ia segment and on each Multibarrier is possible to connect up to four transmitters. See an example of segment with Multibarrier in the Fig. 5.

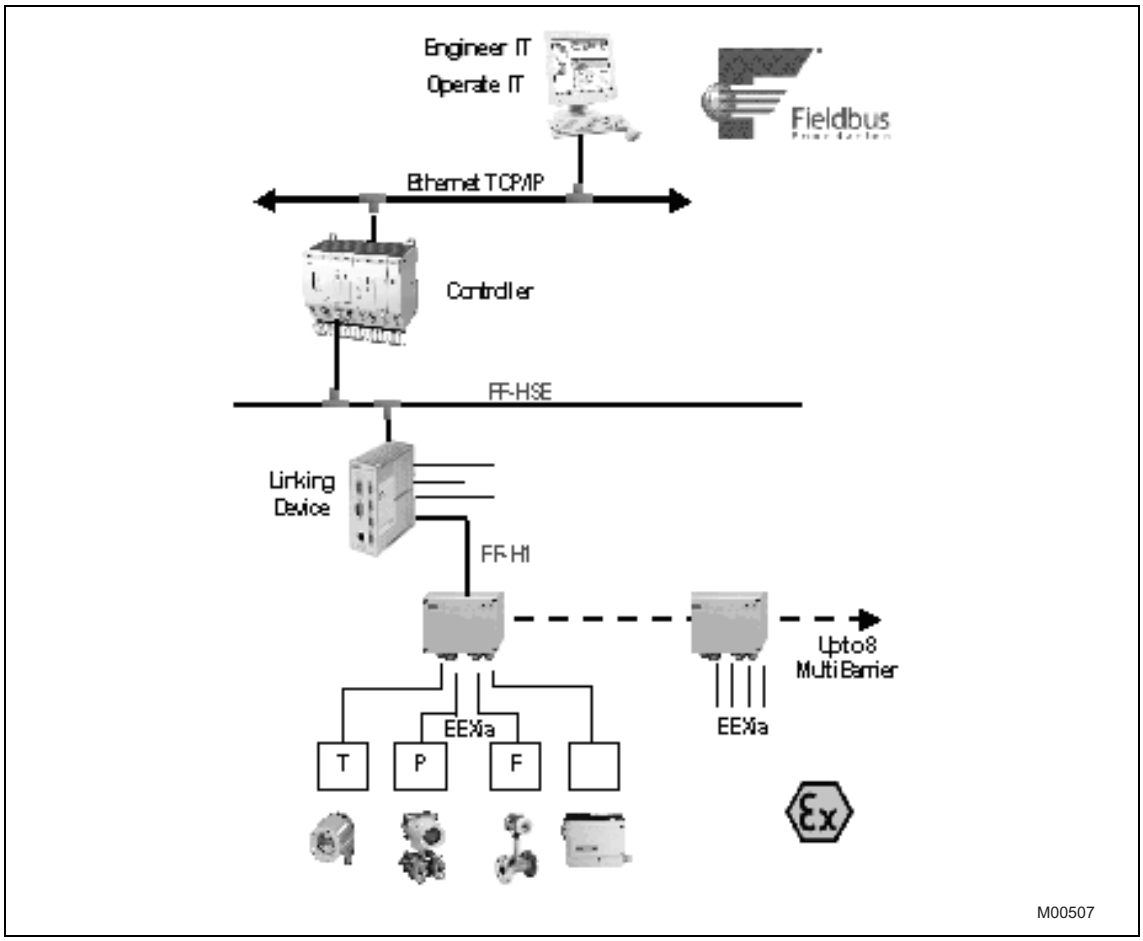


Fig. 5: ABB Solution for FOUNDATION Fieldbus

6.1 Electrical Connections

The 2600 FF is a Bus Powered device with FOUNDATION Fieldbus output. On the terminal block, two screws for the BUS CONNECTION are available, see the Fig. 6.

The Polarity has not consistency, so the two bus cables can be connected without take care about the polarity.

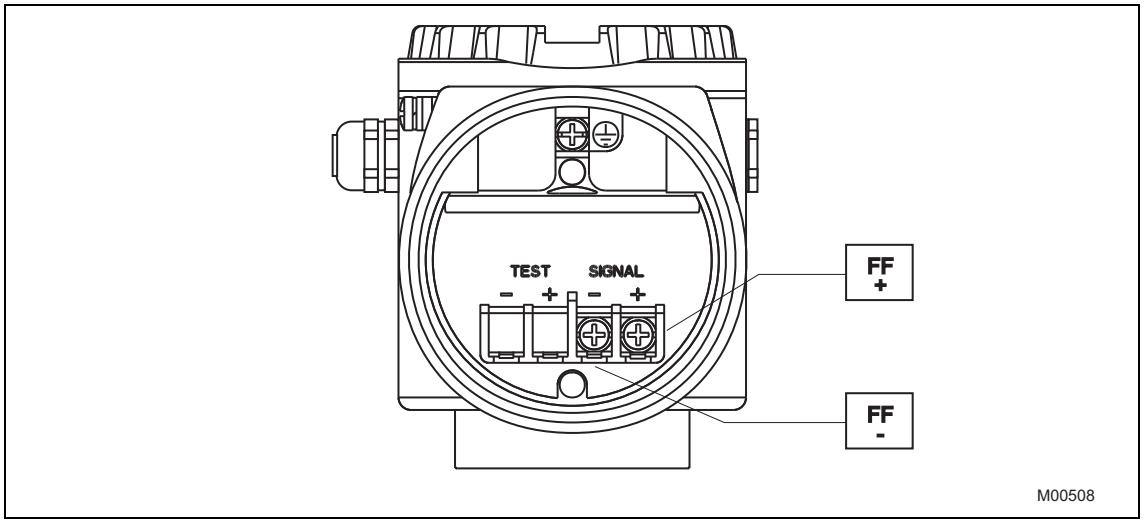


Fig. 6: Terminal Block

The special FF connector (gland receptacles) is also available as optional item for the “quick connection” of the transmitter to the bus.

If necessary the ground terminal could be also connected. For details about the connections, refer to the “Fieldbus Installation & Planning Guide” document AG-165 available on the Fieldbus FOUNDATION website (www.fieldbus.org).

7 FOUNDATION Fieldbus Overview

In the Fig. 7, is represented how the Function Blocks inside the FF devices connected on the bus, can be linked together in order to achieve a simple control loop. After the loop has been designed, the LAS Master device located in the Controller or, as back up, in the slave device itself, starts the scheduling of the Function Block executions and of the publisher / subscriber communications in a deterministic way.

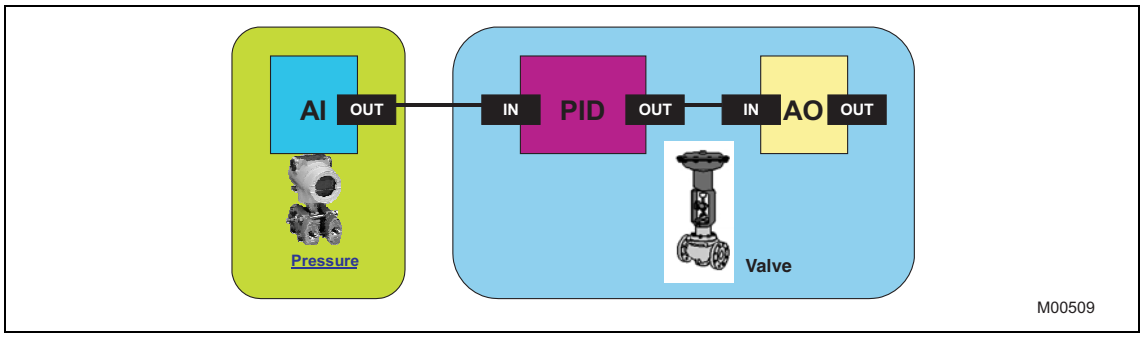


Fig. 7: Simple Single Loop configuration example

In the example of Fig. 7, the Pressure Transmitter implementing the AIFB publish the pressure value, then the PID FB implemented in the valve, subscribe this value from the bus in order to be used as input for the PIDFB. In the same way the exchange of values between the PIDFB and the AOFB occurs but without communications on the bus, because the two Blocks are inside the same device.

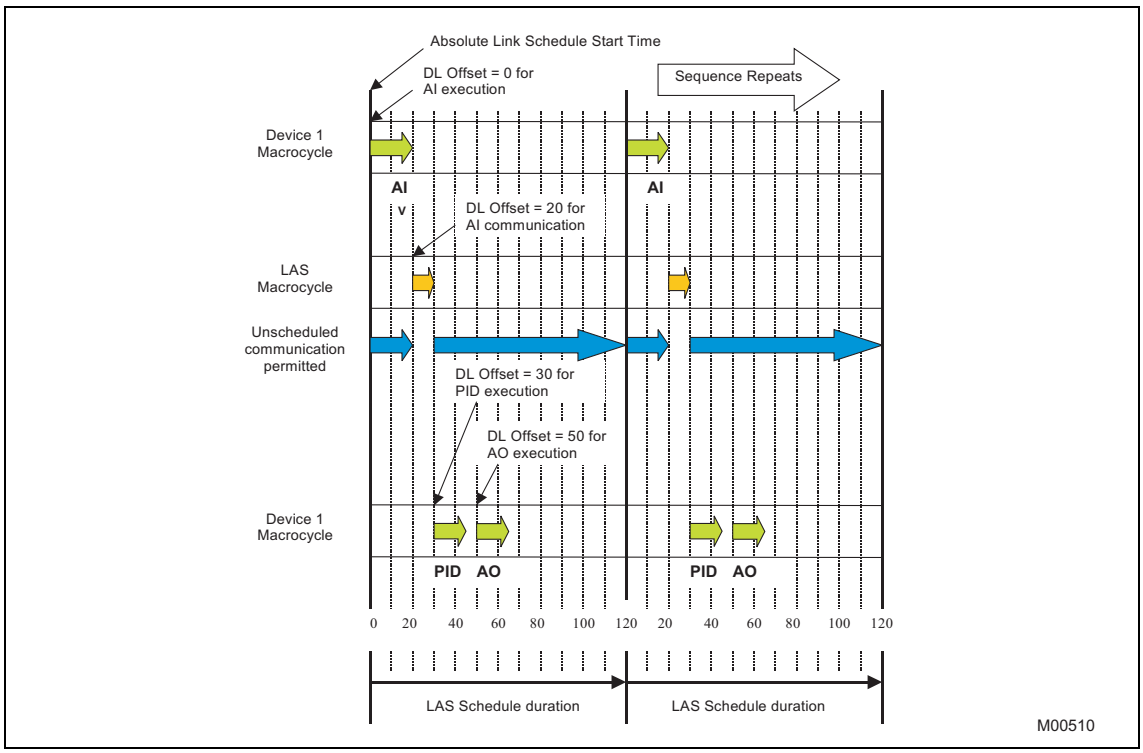


Fig. 8: Macro-cycle example

In the Fig. 8 is represented the macro cycle of the above loop. The LAS functionality inside the controller provides to handle the loop, and the macro-cycle is the temporary representation of how, function blocks and communications, are scheduled. From the instant 0 to 20 the AIFB is executed, in the period from 20 to 30 the LAS provide to schedule the AIFB output. The Pressure Transmitter provides to publish the pressure value, the PIDFB subscribes this value. Then the PIDFB is executed from the instant 30 to 40 and at the end, the PIDFB output is scheduled and goes in input to the AOFB without communications because the two Function blocks reside inside the same device.

The unscheduled communications are always active unless during the period between 20 - 30 when the pressure value is published on the bus.

The LAS functionality handling the control loops, is also available inside the models 265 / 267 / 269 FF Revision 1. Referring to the Fig. 9, whenever failure of the controller occurs, and the LAS[1] stops its execution, the 2600T previously set as back-up LAS[2] take care of the loop maintaining alive the Fieldbus executing the same macro cycle that was active before of the controller failure.

Important

When more than 1 field device is configured as LAS Backup, the one with lower Node Address has high priority for assuming the control when the Primary LAS fails.

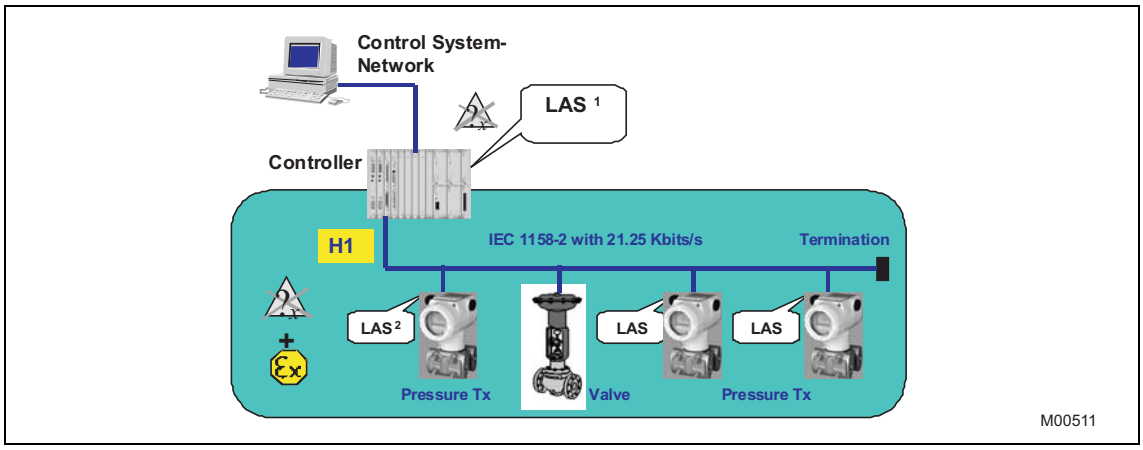


Fig. 9: Back-up LAS diagram

Further and detailed descriptions about the FOUNDATION Fieldbus concepts refers to the “Technical Overview'” document FD-043 available on the Fieldbus Foundation website (www.fieldbus.org).

8 Initialisation

At the power up, the 2600T FF executes some internal self-tests. Both the Hardware and the memory contents are checked before to start the normal operations.

By default, the Function Blocks of the 2600T FF are not running, until a FB application is not downloaded into the transmitter.

After the Function Block has been successfully downloaded into the transmitter, the FB´s start to be scheduled producing an output value to be used for the Process Control.

By default the 2600T starts according to the following table

	265G/A	265D	267J / 269J	267C / 269C
Channel 1 Pressure transducer: PRIMARY_VALUE	Analog Input1	Analog Input1	Analog Input1	Analog Input1
Channel 2 Pressure transducer: SECONDARY_VALUE Sensor temperature	-	-	-	-
Channel 3 Pressure transducer: STATIC_PRESSURE	-	Analog Input 2	Analog Input 2	Analog Input 2
Channel 4 Temperature transducer: PRIMARY_VALUE	-	-	Analog Input 3	Analog Input 3
Channel 1001 (fixed) Multivariable: OUT_MASS_FLOW	-	-	-	OUT_MASS_FLOW
Channel 1002 (fixed) Multivariable: OUT_VOL_FLOW	-	-	-	OUT_VOL_FLOW

Important

Two output values (e.g. PRIMARY_VALUE and SECONDARY_VALUE) must always have different channel numbers.

The Temperature Transducer Block only exists in 2600T – 267J / C, 269J / C transmitters and the Multivariable Function Block only exists in 267C, 269C transmitters. The outputs for mass and volume flow are dedicated to the Multi Variable Function. These outputs can also be given to an Analog Input with choosing the channel 1001 or 1002.

9 Device Addressing

When the models 265 / 267 / 269 FF Transmitter are connected on a FF bus, the Master has to recognize them with a unique address in the world. For this reason, the FF specifications define three different addressing levels that characterize the FF devices:

- The DEV_ID is the unique device identifier.
- The PD_TAG is the physical name of the device.
- The Node Address is the real node at which the device is connected on the bus. It is automatically set by the Master (Primary LAS).

The most important one with the higher priority is the DEV_ID. This is a string of 32 characters and must identify in a unique way each FF device in the world.

In order to fulfil this requirement the models 265 / 267 / 269 FF applies the following mechanism:

- The first part of the string is of 10 characters, the Manufacturer Code "000320" and Device Type code "0089" for 265, "008A" for 267 / 269.
- The second part of the string is of 12 characters and represent the device type identification; "_2600T_TO___" for 265, "_2600T_MV___" for 267 / 269.
- The third part of the string is of 10 characters and is filled with the TB_SENSOR_SERIAL_NUMBER read from the transducer database. This number is written at factory configuration stage and it is assigned in a well defined way just to be sure to have always different numbers.

Finally, the DEV_ID appears of 32 characters in this way “0003200089_2600T_TO___xxxxxxxxxx”, where the entire “x” represents the Serial number.

Whenever an electronics replacement after an electronics failure is necessary, appear clear that the device will be recognized on the network as before of the replacement. This is possible because the transducer, which includes the serial number, remains unchanged and the DEV_ID will be maintained the same as before of the failure.

10 Device Configuration

10.1 Device Description

The models 265 / 267 / 269 FF Pressure Transmitter offers a set of variables available trough the FF communication. The Master for configuration and maintenance purposes can access the variables with Read and Write operations each addressed by an Index number. The FF Profile Standard defines the relative index of each variable, but the Start Index of each block is Manufacturer specific.

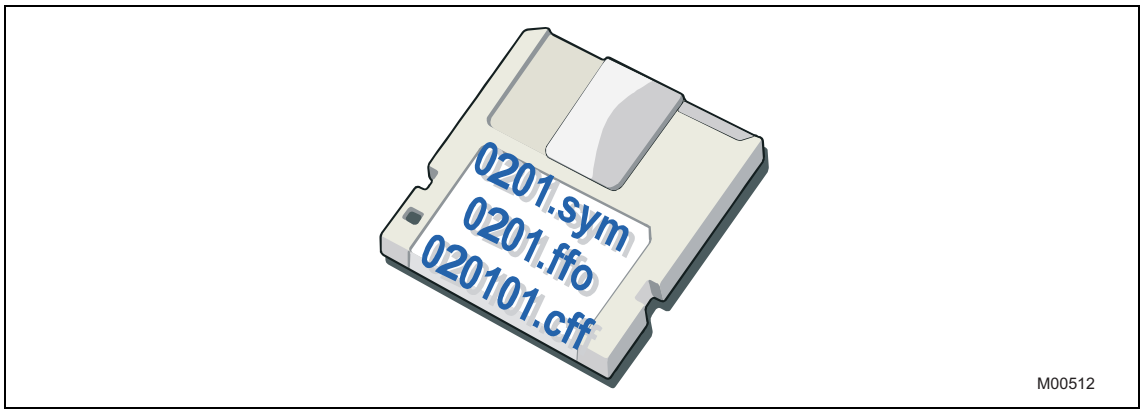


Fig. 10: Device names

In order to allow a full visibility and support of the variables mapped inside the models 265 / 267 / 269 transmitter, it is necessary to import in the Master configuration system the DD files (.sym, and .ffo). These files together with the Capability file (.cff) are available from the ABB Instrumentation SpA or directly from the website www.abb.com.

These registered files have the following names:

- 0201.sym as DD symbol file
- 0201.ffo
- 020101.cff as Capability file

The lists of the variables available on the FF communication are reported in the following tables with the relevant block where:

IDX → Relative Index of the Variable

PC → Access Type for the variables

Important

Some variables can be changed only if the relevant block is in Out of Service.

The RB the AIFB and the PIDFB are implemented in accordance with the Function Block Part 2 specification Document, the TB is a manufacturer specific implementation.

For details about the meaning of each single variable refer at the FF Function Block Part 2 (Ref. 1), and at the Transducer Block Application Process Part 2 (Ref. 2).

10.2 Resource Block

Idx	Name	Byte	PC	Description
0	BLOCK_OBJ	62	mix.	In the Block Object data structure, there are different items describing the block characteristics. Execution period, Number of parameters in the block, the DD Revision, Profile Revision, View Objects characteristics and so on.
1	ST_REV	2	R	The revision level of the Static data associated with the Function Block. The revision level is incremented each time a static parameter value in the block is changed.
2	TAG_DESC	32	R/W	The user description of the intended application of the block.
3	STRATEGY	2	R/W	The strategy field can be used to identify grouping of blocks. This data is not checked or processed by the block.
4	ALERT_KEY	1	R/W	The identification number of the plant unit. This information may be used in the host for sorting alarms, etc.
5	MODE_BLK	1	R/W	Target - The selected mode from the operator.
		1	R	Actual - The mode the block is currently in.
		1	R/W	Permitted - Allowed modes that the target may take on.
		1	R/W	Normal - The common mode for the Actual.
6	BLOCK_ERR	2	R	This parameter reflects the error status associated with the hardware or software components associated with a block. It is a bit string, so that multiple errors may be shown.
7	RS_TSATE	1	R	State machine of the function block application.
8	TEST_RW	112	R/W	Read/Write test parameter - used only for conformance testing.
9	DD_RESOURCE	32	R	String identifying the tag of the resource, which contains the Device Description for this resource.
10	MANUFAC_IDF	4	R	Manufacturer Identification number - used by an interface device to locate the DD file for the resource. **000320 hex for ABB**
11	DEV_TYPE	2	R	Manufacturer's model number associated with the resource - used by interface devices to locate the DD file for the resource.
12	DEV_REV	1	R	Manufacturer's revision number associated with the resource - used by interface devices to locate the DD file for the resource.
13	DD_REV	1	R	Revision of the DD associated with the resource - used by interface devices to locate the DD file for the resource.

Idx	Name	Byte	PC	Description
14	GRANT_DENY	1	R/W	Grant
		1	R/W	Deny
15	HARD_TYPES	2	R	The type of Hardware available as channel numbers. For the 2600T – 265 / 267 / 269 this is limited to Scalar Inputs (i.e. Analog Input).
16	RESTART	1	R/W	Allows a manual restart to be initiated. More restart are possible, they are: 1. **Run** - Normal state when running 2. **Restart Resource** 3. **Restart with Default** - Set the parameters to INITIAL VALUES. 4. Restart Processor - perform a warm start-up 5. **Reset to Factory Sensor Trimming** - Re-load the original Factory Calibration
17	FEATURES	2	R	Used to show supported resource block options.
18	FEATURES_SEL	2	R/W	Used to select resource block options.
19	CYCLE_TYPE	2	R	Identifies the block execution methods for this resource.
20	CYCLE_SEL	2	R/W	Used to select the block execution methods for this resource. The 2600T – 265 / 267 / 269 supports the following: - **Scheduled:** Blocks are executed depending by the function block schedule. - **Block execution:** A block may be executed by linking to another block completion.
21	MIN_CYCLE_T	4	R	Time duration of the shorted cycle interval of which the resource is capable.
22	MEMORY_SIZE	2	R	Available configuration memory in the empty resource. To be checked before attempting a download.
23	NV_CYCLE_TIME	4	R	Minimum time interval for writing copies of NV parameters to non-volatile memory. Zero means it will be never automatically copied.
24	FREE_SPACE	4	R	Percent of memory available for further configuration. Zero in a preconfigured device.
25	FREE_TIME	4	R	Percent of the block processing time that is free to process additional blocks.

Idx	Name	Byte	PC	Description
26	SHED_RCAS	4	R/W	Time duration at which to give up on computer writes to function block Rcas locations. Shed from Rcas shall never happen when Shed_Rcas = 0.
27	SHED_ROUT	4	R/W	Time duration at which to give up on computer writes to function block Rout locations. Shed from Rout shall never happen when Shed_Rout = 0.
28	FAULT_STATE	!	R	Fault State
29	SET_FSTATE	1	R/W	Set Fault State
30	CLR_FSTATE	1	R/W	Clear Fault State
31	MAX_NOTIFY	1	R	Maximum number of unconfirmed alert notify messages possible.
32	LIM_NOTIFY	1	R/W	Maximum number of unconfirmed alert notify messages allowed.
33	CONFIRM_TIME	4	R/W	The minimum time between retries of alert report. Retries shall not happen when Confirm_Time = 0.
34	WRITE_LOCK	1	R/W	If set, no writes from anywhere are allowed except to clear Write_Lock. Block inputs will continue to be updated.
35	UPDATE_EVT			This alert is generated by any change to the static data.
		1	R/W	Unacknowledged:
		1	R	Update State:
		8	R	Time Stamp: The date and time of when the alert was generated.
		2	R	Static Revision: The number of the last increment generating the alert.
		2	R	Relative Index: The index of the changed variable generating the alert.
36	BLOCK_ALM			The block alarm is used for all configuration, hardware, connection failure or system problems in the block. The cause of the alert is entered in the subcode field. The first alert to become active will set the Active Status in the status parameter. As soon as the Unreported status is cleared by the alert reporting task, another block alert may be reported without clearing the Active Status, if the subcode has changed:
		1	R/W	Unacknowledged:
		1	R	Alarm State
		8	R	Time Stamp: The date and time of when the alert was generated.
		2	R	Subcode: Cause of the alert
		1	R	Value: The value generating the alert.

Idx	Name	Byte	PC	Description
37	ALARM_SUM		The alert status associated to the function block.	
		2	R	Current
		2	R	Unacknowledged:
		2	R	Unreported
		2	R/W	Disabled
38	ACK_OPTION	2	R/W	Selection of whether alarms associated the function block will be automatically acknowledged.
39	WRITE_PRI	1	R/W	Priority of the alarm generated by clearing the write_lock:
40	WRITE_ALM		This alert is generated if the write_lock parameter is cleared	
		1	R	Unacknowledged
		1	R	Alarm State
		8	R	Time Stamp: The date and time of when the alert was generated.
		2	R	Subcode
		1	R	Value
41	ITK_VER	2	R	Major revision number of the Interoperability test case used in certifying this device as interoperable.
42	SOFTWARE_ SPECIFICS	18	R	Only for internal use
43	DEVICE_ID_NO	16	R	Device serial number
44	DEVICE_ CERTIFICATION	32	R	Device Certification
45	METER_OPTION	1	R/W	Value for LCD 1: OUT_AIDP 2: PERCENT 4: MASS_FLOW 5: VOL_FLOW

Idx	Name	Byte	PC	Description
46	DIAGNOSIS	4	R	Diagnosis Data: 0x00000001: Hardware failure. 0x00000010: Memory failure. 0x00000020: A-D converter failure. 0x00001000: Coldstart, Device starts after power on.
47	DIAGNOSIS_ EXTENSION1	4	R	Additional Diagnosis Data 1: 0x00000001: Communication error with electronic eeprom. 0x00000002: Communication error with sensor eeprom. 0x00000004: Max. writes cycles of electronic eeprom reached. 0x00000008: Max. writes cycles of sensor eeprom reached. 0x00000010: Electronic data error. 0x00000020: Sensor data error. 0x00000040: User data error. 0x00000080: Factory reset data error. 0x00000100: Fieldbus user data error. 0x00000200: Burn eeprom data. 0x00000400: Fieldbus factory reset data error. 0x00001000: Device is busy. 0x00002000: Cyclic eeprom data error. 0x00004000: Cyclic eeprom data error. 0x00008000: Cyclic eeprom data error. 0x00010000: Rom error. 0x00020000: CPU ram error. 0x00040000: External ram error. 0x00100000: Communication timeout. 0x00200000: Device malfunction.

Idx	Name	Byte	PC	Description
48	DIAGNOSIS_ EXTENSION2	2	R	Additional Diagnosis Data 2: 0x0001: Differential pressure is out of range. 0x0002: Pressure is out of range. 0x0004: Temperature is out of range. 0x0010: Temperature is out of limits. 0x0020: Temperature is out of range. 0x1000: Main pressure is out of limits. 0x2000: Main pressure is out of range. 0x4000: Sensor temperature is out of limits. 0x8000: Static pressure is out of limits.
49	DEVICE_MESSAGE	32	R/W	User specific message
50	DEVICE_INSTAL_ DATE	16	R/W	Device install date
51	HARDWARE_ REVISION	1	R	Hardware-Revision.
52	RB_RESERVED_1	1	R	Only for internal use
	RB_RESERVED_2	16	R	Only for internal use
	RB_RESERVED_3	16	R	Manufacturer specific device type description
	RB_RESERVED_4	32	R	Only for internal use
	RB_RESERVED_5	2	R	Only for internal use
	RB_RESERVED_6	1	R	Only for internal use

10.3 Analog Input Function Block

Idx	Name	Byte	PC	Description
0	BLOCK_OBJ	62	mix.	In the Block Object data structure, there are different items describing the block characteristics. Execution period, Number of parameters in the block, the DD Revision, Profile Revision, View Objects characteristics and so on.
1	ST_REV	2	R	The revision level of the Static data associated with the Function Block. The revision level is incremented each time a static parameter value in the block is changed.
2	TAG_DESC	32	R/W	The user description of the intended application of the block.
3	STRATEGY	2	R/W	The strategy field can be used to identify grouping of blocks. This data is not checked or processed by the block.
4	ALERT_KEY	1	R/W	The identification number of the plant unit. This information may be used in the host for sorting alarms, etc.
5	MODE_BLK	1	R/W	Target - The selected mode from the operator.
		1	R	Actual - The mode the block is currently in.
		1	R/W	Permitted - Allowed modes that the target may take on.
		1	R/W	Normal - The common mode for the Actual.
6	BLOCK_ERR	2	R	This parameter reflects the error status associated with the hardware or software components associated with a block. It is a bit string, so that multiple errors may be shown.
7	PV	4	R	The process variable used in block execution, expressed in XD_SCALE unit Code.
		1	R	The process variable status
8	OUT	4	R	The block output value calculated as a result of the block execution, expressed in OUT_SCALE unit code **Only when the function block is in Manual MODE this variable can be written**
		1	R	The block output status
9	SIMULATE	1	R/W	Simulate Transducer Status
		4	R/W	Simulate Transducer Value
		1	R	Simulate Transducer Status
		4	R	Simulate Transducer Value
		1	R/W	Simulation Enable/Disable bit

Idx	Name	Byte	PC	Description	
10		4	R/W	High Range	All the values are associated with the channel input value.
		4	R/W	Low Range	
		2	R/W	Unit Index	
		1	R/W	Decimal Point	
				Code for Pressure	
				1130 pascal	1145 Kilograms / centimeter2
				1131 gigapascal	1146 inches H2O (20 deg. C)
				1132 Megapascal	1147 inches H2O (4 deg. C)
				1133 Kilopascal	1148 inches H2O (68 deg. F)
				1134 Millipascal	1149 mm H2O (20 deg. C)
				1135 Micropascal	1150 mm H2O (4 deg. C)
				1136 Hectopascal	1151 mm H2O (68 deg. F)
				1137 bar	1152 feet H2O (20 deg. C)
				1138 millibar	1153 feet H2O (4 deg. C)
				1139 Torr (0 deg. C)	1154 feet H2O (68 deg. F)
				1140 Atmosphere ’	1155 inches Hg
				1141 Psi	1156 inches Hg (0 deg. C)
				1142 Psia	1157 mm Hg
				1143 Psig	1158 mm Hg (0 deg. C)
				1130 grams / centimeter2	
				Code for Level	
				1010 meters	1011 angstrom
				1011 Km	1012 feet
				1012 cm	1013 inches
				1013 mm	1014 yard
				1014 micron	1015 mile
				1015 nm	1016 naut.mile
				1010 pm	

Idx	Name	Byte	PC	Description	
				Code for Flow	
				1347 cubic meters per sec	1361 Std.Cubic feet per day
				1348 cubic meters per min	1362 Gallons per sec
				1349 cubic meters per hour	1363 Gallons per min
				1350 cubic meters per day	1364 Gallons per hour
				1351 liters per sec	1365 Gallons per day
				1352 liters per min	1366 Megagallons per day
				1353 liters per hour	1367 Imperial gallons per sec
				1354 liters per day	1368 Imperial gallons per min
				1355 Megaliters per day	1369 Imperial gallons per hour
				1356 Cubic feet per sec	1370 Imperial gallons per day
				1357 Cubic feet per min	1371 barrel per sec
				1358 Cubic feet per hour	1372 barrel per min
				1359 Cubic feet per day	1373 barrel per hour
				1360 Std.Cubic feet per hour	1374 barrel per day

Idx	Name	Byte		PC	Description
				Code for Volume	
				1034 cubic meters	1034 cubic yard
				1035 cubic decimeters	1035 cubic mile
				1036 cubic centimeters	1036 pint
				1037 cubic millimeters	1037 quart'
				1038 liters	1038 gallons
				1039 centiliters	1039 imp.gallons
				1040 milliliters	1040 bushel
				1041 hectoliters	1041 barrel
				1042 cubic inch	1042 barrel liq.
				1043 cubic feet	1043 Standard cubic foot
11	OUT_SCALE	4	R/W	High Range	All the values are associated with the OUT. All the units´ code specified by the FF is available for this Scaling. Refer to the FF specs (Ref. 2) for the complete set of available unit code
		4	R/W	Low Range	
		2	R/W	Unit Index	
		1	R/W	Decimal Point	
12	GRANT_DENY	1	R/W	Grant	
		1	R/W	Deny	
13	IO_OPTS	2	R/W	Option which the user can select to alter Input and Output block processing. Only the Low cut-off can be enabled / disabled	
14	STATUS_OPTS	2	R/W	Option which the user can select block processing of status. The available selections are: - Propagate Fault Forward - Uncertain if Limited - BAD if Limited - Uncertain if MAN Mode	
15	CHANNEL	2	R/W	The CHANNEL value is used to select the measurement value from the I/O block. Refer to the TABLE B of this Manual for understand how the CHANNEL can be selected.	
16	L_TYPE	1	R/W	Linearization Type. The selectable types are: - Direct - Indirect - Indirect Square Root	

Idx	Name	Byte	PC	Description
17	LOW_CUT	4	R/W	Limit used in square root processing. A value of zero percent of scale is used in block processing if the transducer falls below this limit, in % of scale. The features may be used to eliminate noise near zero for a flow sensor.
18	PV_FTIME	4	R/W	Time constant of a single exponential filter for the PV, expressed in seconds. This is the time necessary for reach the 63 % of the variation in input
19	FIELD_VAL	4	R	The percent of the value from the Transducer block or from the simulation value, when enabled, before the characterisation (L_TYPE) and Filtering (PV_FTIME).
		1	R	Field Value Status
20	UPDATE_EVT			This alert is generated by any change to the static data.
		1	R/W	Unacknowledged
		1	R	Update State
		8	R	Time Stamp: The date and time of when the alert was generated.
		2	R	Static Revision
		2	R	Relative Index
21	BLOCK_ALM			The block alarm is used for all configuration, hardware, connection failure or system problems in the block. The cause of the alert is entered in the subcode field. The first alert to become active will set the Active Status in the status parameter. As soon as the Unreported status is cleared by the alert reporting task, another block alert may be reported without clearing the Active Status, if the subcode has changed.
		1	R/W	Unacknowledged
		1	R	Alarm State
		8	R	Time Stamp: The date and time of when the alert was generated.
		2	R	Subcode
		1	R	Value

Idx	Name	Byte	PC	Description
22	ALARM_SUM			The block alarm is used for all configuration, hardware, connection failure or system problems in the block. The cause of the alert is entered in the subcode field. The first alert to become active will set the Active Status in the status parameter. As soon as the Unreported status is cleared by the alert reporting task, another block alert may be reported without clearing the Active Status, if the subcode has changed:
		2	R	Current
		2	R	Unacknowledged
		2	R	Unreported
		2	R/W	Disabled
23	ACK_OPTION	2		Used to set auto acknowledgment of the alarms.
24	ALARM_HYS	4		Amount the PV must return within the alarm limit before the alarm condition clears. Alarm Hysteresis is expressed as percent of the OUT_SCALE span.
25	HI_HI_PRI	1	R/W	Priority of the High High Alarm
26	HI_HI_LIM	4	R/W	The setting of the High High Limit producing the High High Alarm. This value is expressed in OUT_SCALE Unit Code
27	HI_PRI	1	R/W	Priority of the High Alarm
28	HI_LIM	4	R/W	The setting of the High Limit producing the High Alarm. This value is expressed in OUT_SCALE Unit Code
29	LO_PRI	1	R/W	Priority of the Low Alarm
30	LO_LIM	4	R/W	The setting of the Low Limit producing the Low Alarm. This value is expressed in OUT_SCALE Unit Code.
31	LO_LO_PRI	1	R/W	Priority of the Low Low Alarm
32	LO_LO_LIM	4	R/W	The setting of the Low Low Limit producing the Low Low Alarm. This value is expressed in OUT_SCALE Unit Code:

Idx	Name	Byte	PC	Description
33	HI_HI_ALM			The HI HI Alarm data
		1	R/W	Unacknowledged
		1	R	Alarm State
		8	R	Time Stamp: The date and time of when the alert was generated.
		2	R	Subcode
		4	R	Value: The date and time of when the alert was generated.
34	HI_ALM			The HI Alarm data
		1	R/W	Unacknowledged
		1	R	Alarm State
		8	R	Time Stamp: The date and time of when the alert was generated.
		2	R	Subcode
		4	R	Value: The date and time of when the alert was generated.
35	LO_ALM			The Lo Alarm data
		1	R/W	Unacknowledged
		1	R	Alarm State
		8	R	Time Stamp: The date and time of when the alert was generated.
		2	R	Subcode
		4	R	Value: The date and time of when the alert was generated.
36	LO_LO_ALM			The Lo Lo Alarm data
		1	R/W	Unacknowledged
		1	R	Alarm State
		8	R	Time Stamp: The date and time of when the alert was generated.
		2	R	Subcode
		4	R	Value: The date and time of when the alert was generated.

10.4 Pressure Transducer Block

The modification of the flow configuration with 267C / 269C transmitters is only possible with the “Device Management Application” (DMA). In this reason, have parameters with influence to the flow calculation with 267C / 269C transmitters different from this table a read only attribute.

Idx	Name	Byte	PC	Description
0	BLOCK_OBJ	62	mix.	In the Block Object data structure, there are different items describing the block characteristics. Execution period, Number of parameters in the block, the DD Revision, Profile Revision, View Objects characteristics and so on.
1	ST_REV	2	R	The revision level of the Static data associated with the Function Block. The revision level is incremented each time a static parameter value in the block is changed.
2	TAG_DESC	32	R/W	The user description of the intended application of the block.
3	STRATEGY	2	R/W	The strategy field can be used to identify grouping of blocks. This data is not checked or processed by the block.
4	ALERT_KEY	1	R/W	The identification number of the plant unit. This information may be used in the host for sorting alarms, etc.
5	MODE_BLK	1	R/W	Target - The selected mode from the operator.
		1	R	Actual - The mode the block is currently in.
		1	R/W	Permitted - Allowed modes that the target may take on.
		1	R/W	Normal - The common mode for the Actual.
6	BLOCK_ERR	2	R	This parameter reflects the error status associated with the hardware or software components associated with a block. It is a bit string, so that multiple errors may be shown.
7	UPDATE_EVT			This alert is generated by any change to the static data.
		1	R/W	Unacknowledged
		1	R	Update State
		8	R	Time Stamp: The date and time of when the alert was generated.
		2	R	Static Revision
		2	R	Relative Index

Idx	Name	Byte	PC	Description
8	BLOCK_ALM			The block alarm is used for all configuration, hardware, and connection failure or system problems in the block. The cause of the alert is entered in the sub-code field. The first alert to become active will set the Active Status in the status parameter. As soon as the Unreported status is cleared by the alert reporting task, another block alert may be reported without clearing the Active Status, if the sub-code has changed.
		1	R/W	Unacknowledged
		1	R	Alarm State
		8	R	Time Stamp: The date and time of when the alert was generated.
		2	R	Sub-code
		1	R	Value
9	TRANSDUCER_ DIRECTORY	4	R	Directory that specifies the number and starting indices of the transducers in the transducer block.
10	TRANSDUCER_ TYPE	2	R	Identifies the transducer type. **For the 2600T FF it is 100 = Standard Pressure with calibration.**
11	XD_ERROR	1	R	Transducer block error sub-code
12	COLLECTION_ DIRECTORY	36	R	Directory that specifies the number, starting indices, and the DD items IDs of the data collections in each transducer within a transducer block.
13	PRIMARY_VALUE_ TYPE	2	R	Type of measurement representing the primary value. The default measurement type is Differential Pressure.
				100 Mass Flow **101** Volumetric Flow **107** Differential Pressure **108** Gauge Pressure **109** Absolute Pressure **110** Level **200** Volume

Idx	Name	Byte	PC	Description	
14	PRIMARY_VALUE	4	R	This is the output value from the TB and input for the AIFB when CHANNEL = 1. It is always represented in the PRIMARY_VALUE_RANGE Unit-Index.	
		1	R	This is the output status from the TB.	
15	PRIMARY_VALUE_ RANGE	4	R	High Range	All the values are associated with the PRIMARY_VALUE.This record is read only and it is always a copy of the XD_SCALE of the AIFB having the Channel = 1. Whenever writing on XD_SCALE of the AIFB with CHANNEL = 1 are performed, the PRIMARY_VALUE_RANGE is updated in the same way. The usable units´ code is the same of the XD_SCALE in the Analog Input Function Block.
		4	R	Low Range	
		2	R	Unit Index	
		1	R	Decimal point	
16	CAL_POINT-_HI	4	R/W	The Highest calibrated value	
17	CAL_POINT-_LO	4	R/W	The lowest calibrated value	
18	CAL_MIN_SPAN	4	R	The minimum span to be used between the calibrations points, high and low.	
19	CAL_UNIT	2	R/W	Calibration Unit. Only Pressure Units are allowed. See in the Analog Input Function Block Table the XD_SCALE Unit Code the allowed **Code for Pressure.**	
20	SENSOR_TYPE	2	R/W	Type of sensor. **The 2600T is -121 - Pressure sensor unknown.**	
21	SENSOR_RANGE	4	R	High Range	All the values represent the physical sensor limits. See in the Analog Input Function Block Table the XD_SCALE Unit Code the allowed **Code for Pressure.**
		4	R	Low Range	
		2	R	Unit Index	
		1	R	Decimal point	
22	SENSOR_SN	32	R	Serial Number of the sensor	
23	SENSOR_CAL_ METHOD	1	R/W	Calibration Method	
24	SENS_CAL_LOC	32	R/W	The last location of the sensor Calibration.	
25	SENS_CAL_DATE	7	R/W	The last date on which the calibration was performed.	

Idx	Name	Byte	PC	Description
26	SENS_CAL_WHO	32	R/W	The name of the person responsible of the last sensor calibration.
27	SENS_ISOL_MTL	2	R	**Type of materials for sensor isolator:** **3** Hastelloy C **4** Monel **5** Tantalum **19** AISI 316L Stainless Steel **136** Monel Gold Plated
28	SENSOR_FILL_ FLUID	2	R	**Type of Fill Fluid used in the sensor:** **1** Silicone Oil **2** Fluorcarbon **3** Fluorcarbon **7** With Oil (FDA)
29	SECONDARY_ VALUE_1	4	R	This is the Sensor temperature value to be linked in input to the AIFB when the CHANNEL = 2 is selected. It is expressed in SECONDARY_VALUE_UNIT_1
		1	R	This is the Sensor temperature Status.
30	SECONDARY_ VALUE_UNIT_1	2	R/W	Sensor Temperature Unit. The allowed units are: **1000** Kelvin **1001** Celsius Degree **1002** Fahrenheit Degree **1003** Rankine Degree
31	ZERO_POINT_ CORRECTION	1	R/W	The sensor oblique will be corrected with writing of the value 2. The process connection must be pressure free.
32	MODUL_TYPE	2	R	Type of pressure sensor.
33	STATIC_ PRESSURE_ SENSOR_RANGE	4	R	Static pressure sensor range for differential pressure sensor.
34	RATED_PRESSURE	1	R	Rated pressure, max. operating pressure. **2** PN6 **6** PN100 **7** PN250 **12** PN160 **15** PN41
35	PROCESS_ CONNECTION_ O_RING_MTL	2	R/W	**Type of materials for the O-ring:** **12** Buna **11** Viton **133** Perfluoro elastomer **138** EPDM **251** None

Idx	Name	Byte	PC	Description
36	PROCESS_ CONNECTION_ TYPE	2	R/W	**Type of Process connection:** **1** Flange and 1/4-18 NPT. **2** DIN 19213 and 1/4-18 NPT. **3** DIN 16288 B-G 1/2A (R 1/2"). **4** DIN 16288 Form D-G 1/2A. **5** NPT 1/2" external thread. **6** NPT 1/2" internal thread. **7** NPT 1/4" internal thread.
37	PROCESS_ CONNECTION_ MATERIAL	2	R/W	**Material of the process connection:** **2** Stainless Steel 316 **3** Hastelloy C **4** Monel **19** Stainless Steel 316L **137** PVDF
38	DRAIN_VENT_ PLUG_MATERIAL	2	R/W	**Material of the drain vent plug:** **3** Hastelloy C **4** Monel **28** Stainless Steel 316 Ti
39	REMOTE_SEAL_ TYPE	1	R/W	**Type of remote seal:** **1** Flat diaphragm DN25 **2** Flat diaphragm ANSI 1 in **3** Flat diaphragm DN50 **4** Flat diaphragm ANSI 2 in **5** Flat diaphragm DN80 **6** Flat diaphragm ANSI 3 in **7** Tube DN50 **8** Tube ANSI 2 in **9** Tube DN80 **10** Tube ANSI 3 in **11** In-line RS DN25 / ANSI 1 in **12** In-line RS DN40 / ANSI 1,5 in **13** In-line RS DN50 / ANSI 2 in **14** In-line RS DN80 / ANSI 3 in **15** RS with grooved union nut DN50 **16** RS with clamp connect. ANSI 2 in **17** Miniature RS G 1 A **18** Miniature RS G 1/2 A

Idx	Name	Byte	PC	Description
40	NUMBER_ REMOTE_SEAL	1	R/W	**Number of remote seals:** **1** One Seal **2** Two Seals **251** None
41	REMOTE_SEAL_ FILL_FLUID	2	R/W	**Fill fluid of remote seal:** **1** Silicon oil **2** Fluorcarbon **3** Distilled water **4** High temperature oil **5** Vegetable oil **6** Mineral oil **7** White oil **8** Fill fluid FDA certified
42	REMOTE_SEAL_ ISOLATOR_ MATERIAL	2	R/W	**Type of materials for RS isolator:** **3** Hastelloy C **4** Monel **5** Tantalum **19** AISI 316L, Stainless Steel
43	SECONDARY_ VALUE_TRIM_ VALUE	4	R/W	Trim value for pressure sensor temperature.
44	SECONDARY_ VALUE_HI_LIM	4	R	Maximum limit for trim value for pressure sensor temperature.
45	SECONDARY_ VALUE_LO_LIM	4	R	Minimum limit for trim value for pressure sensor temperature.
46	STATIC_PRESS_ PRIMARY_VALUE_ TYPE	2	R/W	The primary value type for static pressure is always 109: Absolute Pressure
47	STATIC_ PRESSURE_VAL	4	R	Value of static pressure measurement.
		1	R	Status of static pressure measurement.
48	STATIC_ PRESSURE_CAL_ POINT_HI	4	R/W	Upper calibration point for static pressure.
49	STATIC_ PRESSURE_CAL_ POINT_LO	4	R/W	Lower calibration point for static pressure.
50	STATIC_ PRESSURE_CAL_ MIN_SPAN	4	R	Minimal span for static pressure calibration.

Idx	Name	Byte	PC	Description	
51	LIN_TYPE	1	R/W	**Linearization type:** **2** Linear **3** Square root **4** Square root to the third power **5** Square root to the fifth power **240** Linearization curve **241** Spherical tank **242** Cylindric lying tank	
52	SCALE_IN_RANGE	4	R/W	High Range	All the values represent the input scaling. **See also 8.4**. Only Pressure unit code is usable. See in the Analog Input Function Block Table the XD_SCALE Unit Code the allowed **Code for Pressure**.
		4	R/W	Low Range	
		2	R/W	Unit Index	
		1	R/W	Decimal point	
53	SET_UPPER_ RANGE	1	R/W	The upper range value will be set with writing of the value 2.	
54	SET_LOWER_ RANGE	1	R/W	The lower range value will be set with writing of the value 2.	
55	STATIC_ PRESSURE_ RANGE	4	R/W	High Range	All the values represent the input scaling. See also 8.4. Only Pressure unit code are usable See in the Analog Input Function Block Table the XD_SCALE Unit Code the allowed **Code for Pressure.**
		4	R/W	Low Range	
		2	R/W	Unit Index	
		1	R/W	Decimal point	
56	LOW_FLOW_CUT_ OFF	4	R/W	Limit used in square root processing. A value of zero percent of scale is used in block processing if the transducer falls below this limit, in % of input scale. The features may be used to eliminate noise near zero for a flow sensor.	
57	FLOW_LIN_SQRT_ POINT		R/W	Limit used in square root processing. Starting from the LOW_FLOW_CUT_OFF value a linear part is applied before to apply the square root function. The FLOW_LIN_SQRT_POINT is effect less if the value is set lower then the LOW_FLOW_CUT_OFF.	

Idx	Name	Byte	PC	Description
58	TAB_OP_CODE	1	58	Modification type for linearization curve.
59	TAB_STATUS	1	59	Status for values of linearization curve.
60	TAB_ACTUAL_NUMBER	1	60	Actual number of X / Y values for linearization curve.
61	TAB_X_Y_VALUE_A	4		X / Y values from number 1 to 11.
62	TAB_X_Y_VALUE_B	4		X / Y values from number 12 to 12.
63	MAX_SENSOR_VALUE	4	R/W	Drag indicator for maximum pressure value. The drag indicator will be reset by writing any value.
64	MIN_SENSOR_VALUE	4	R/W	Drag indicator for minimum pressure value. The drag indicator will be reset by writing any value.
65	MAX_SECONDARY_VALUE	4	R/W	Drag indicator for maximum pressure sensor temperature. The drag indicator will be reset by writing any value.
66	MIN_SECONDARY_VALUE	4	R/W	Drag indicator for minimum pressure sensor temperature. The drag indicator will be reset by writing any value.
67	MAX_STATIC_PRESSURE	4	R/W	Drag indicator for maximum static pressure value. The drag indicator will be reset by writing any value.
68	MIN_STATIC_PRESSURE	4	R/W	Drag indicator for minimum static pressure value. The drag indicator will be reset by writing any value.
69	LOWER_SENSOR_FAILURE	1	R/W	Counter for how often the pressure falls below the lower sensor limit. The counter will be reset by writing any value.
70	UPPER_SENSOR_FAILURE	1	R/W	Counter for how often the pressure exceeds the upper sensor limit. The counter will be reset by writing any value.
71	LOWER_RANGE_FAILURE	1	R/W	Counter for how often the pressure falls below the lower range limit. The counter will be reset by writing any value.

Idx	Name	Byte	PC	Description
72	UPPER_RANGE_ FAILURE	1	R/W	Counter for how often the pressure exceeds the upper range limit. The counter will be reset by writing any value.
73	LOWER_ SECONDARY_ VALUE_FAILURE	1	R/W	Counter for how often the pressure sensor temperature falls below the lower limit. The counter will be reset by writing any value.
74	UPPER_ SECONDARY_ VALUE_FAILURE	1	R/W	Counter for how often the pressure sensor temperature exceeds the upper limit. The counter will be reset by writing any value.
75	LOWER_STATIC_ PRESS_FAILURE	1	R/W	Counter for how often the static pressure falls below the lower sensor limit. The counter will be reset by writing any value.
76	UPPER_STATIC_ PRESS_FAILURE	1	R/W	Counter for how often the static pressure exceeds the upper sensor limit. The counter will be reset by writing any value.
77	PTRB_CHANNEL_ MAP	2	R/W	This parameter is for the correlation of channels in a device to channels as defined for a plant or process area.
78	THRESHOLD_ TIME_ADC	1	R/W	Time for A/D conversion of the primary value in 10 ms tics. The TIME_CONST_P_ADC will be deactivated if the primary value exceeds for longer as the THRESHOLD_TIME_ADC and more as the THRESHOLD_VAL_ADC the actual output of the A/D converter.
79	THRESHOLD_ VAL_ADC	4	R/W	Threshold value for A/D conversion as percent of the primary value. The TIME_CONST_P_ADC will be deactivated if the primary value exceeds for longer as the THRESHOLD_TIME_ADC and more as the THRESHOLD_VAL_ADC the actual output of the A/D converter.
80	TIME_CONST_ P_ADC	4	R/W	Time constant for the static pressure A/D conversion lower or equal then 1. The time constant is zero with value of 1.
81	TIME_CONST_ T_ADC	4	R/W	Time constant for sensor temperature A/D conversion lower or equal then 1. The time constant is zero with value of 1.
82	MEAS_ INTEGRATION_ TIME_ADC	1	R/W	Integration time for primary value (pressure) A/D conversion in 100 ms tics. Range 0 … 13.
83	SECONDARY_ VALUE_1	4	R	Only for internal use.
84	PERCENT_RANGE	4	R	Only for internal use.

10.5 PID Function Block

Idx	Name	Byte	PC	Description
0	BLOCK_OBJ	62	mix.	In the Block Object data structure, there are different items describing the block characteristics. Execution period, Number of parameters in the block, the DD Revision, Profile Revision, View Objects characteristics and so on.
1	ST_REV	2	R	The revision level of the Static data associated with the Function Block. The revision level is incremented each time a static parameter value in the block is changed.
2	TAG_DESC	32	R/W	The user description of the intended application of the block.
3	STRATEGY	2	R/W	The strategy field can be used to identify grouping of blocks. This data is not checked or processed by the block.
4	ALERT_KEY	1	R/W	The identification number of the plant unit. This information may be used in the host for sorting alarms, etc.
5	MODE_BLK	1	R/W	Target - The selected mode from the operator.
		1	R	Actual - The mode the block is currently in.
		1	R/W	Permitted - Allowed modes that the target may take on.
		1	R/W	Normal - The common mode for the Actual.
6	BLOCK_ERR	2	R	This parameter reflects the error status associated with the hardware or software components associated with a block. It is a bit string, so that multiple errors may be shown.
7	PV	4	R	The process variable used in block execution, expressed in PV_SCALE Unit Code
		1	R	The process variable status.
8	SP	4	R/W	The analog Set Point value of this block, expressed in PV_SCALE Unit Code.
		1	R/W	The analog Set Point status of this block.
9	OUT	4	R	The block output value calculated as a result of the block execution, expressed in OUT_SCALE unit code. Only when the function block is in Manual MODE this variable can be written.
		1	R	The block output status

Idx	Name	Byte	PC	Description	
10	PV_SCALE	4	R/W	High Range	All the values are associated with the PV.
		4	R/W	Low Range	
		2	R/W	Unit Index	
		1	R/W	Decimal point	
11	OUT_SCALE	4	R/W	High Range	All the values are associated with the OUT.
		4	R/W	Low Range	
		2	R/W	Unit Index	
		1	R/W	Decimal point	
12	GRANT_DENY	1	R/W	Grant	
		1	R/W	Deny	
13	CONTROL_OPTS	2	R/W	Options the user may select to alter the calculation done in a control loop. The supported actions in the 2600T are: - Bypass enabled - SP-PV track in MAN - SP-PV track in Rout - SP-PV track in LO or IMAN - SP track retained target - Direct acting - Track enable - Track in Manual - Use PV for BKCAL_OUT - No out limits in Manual	
14	STATUS_OPTS	2	R/W	Options the user can select for block processing of status. They are: - Initiate Fault Sate if BAD IN - Initiate Fault Sate if BAD CAS_IN - Use Uncertain as Good - Target to Manual if BAD IN - Target AUTO if BAD CAS_IN	
15	IN	4	R/W	The Primary Input Value for the block coming from another block, expressed in PV_SCALE Unit Code.	
		1	R/W	The Primary Input Status.	
16	PV_FTIME	4	R/W	Time constant of a single exponential filter for the PV, expressed in seconds. This is the time necessary for reach the 63 % of the variation of IN value.	
17	BYPASS	1	R/W	The normal control algorithm may be bypassed trough this parameter. When bypass is set, the set point value (in percent) will be directly transferred to the output.	

Idx	Name	Byte	PC	Description
18	CAS_IN	4	R/W	Remote set point value from another block. Expressed in PV_SCALE Unit Code
		1	R/W	Remote set point status from another block
19	SP_RATE_DN	4	R/W	Ramp rate for downward SP changes. When the ramp rate is set to zero the SP is used immediately. Expressed in PV_SCALE Unit Code per seconds.
20	SP_RATE_UP	4	R/W	Ramp rate for upward SP changes. When the ramp rate is set to zero the SP is used immediately. Expressed in PV_SCALE Unit Code per seconds.
21	SP_HI_LIM	4	R/W	The Highest Set Point value allowed. Expressed in PV_SCALE Unit Code.
22	SP_LO_LIM	4	R/W	The Lowest Set Point value allowed. Expressed in PV_SCALE Unit Code.
23	GAIN	4	R/W	The proportional gain value.
24	RESET	4	R/W	The integral time constant, in seconds per repeat.
25	BAL_TIME	4	R/W	The specified time for the internal working value of bias to return to operator set bias. Also used to specify the time constant at which the integral term will move to obtain balance when the output is limited and the mode is AUTO, CAS, or RCAS. Expressed in seconds.
26	RATE	4	R/W	The derivative action time constant expressed in seconds.
27	BKCAL_IN	4	R/W	The analog input value from another block's BKCAL_OUT output that is used to prevent reset windup and to initialize the control loop. Expressed in OUT_SCALE Unit Code.
		1	R/W	Back Calculation Input Status
28	OUT_HI_LIM	4	R/W	The max. Output value allowed. Expressed in OUT_SCALE Unit Code.
29	OUT_LO_LIM	4	R/W	The min. Output value allowed. Expressed in OUT_SCALE Unit Code.
30	BKCAL_HYS	4	R	The amount that the output must change away from its output limit before the limit status is turned off. Expressed as percent of the OUT_SCALE span.

Idx	Name	Byte	PC	Description	
31	BKCAL_OUT	4	R	The value required by an upper block's BKCAL_IN so that the upper block may prevent reset windup and provide bumpless transfer to closed control loop. Expressed in PV_SCALE Unit Code.	
		1	R	Back Calculation Status	
32	RCAS_IN	4	R/W	Target setpoint value provided by a supervisory host. Used when mode is RCAS. Expressed in PV_SCALE Unit Code.	
		1	R/W	RCAS_IN Status	
33	ROUT_IN	4	R/W	Target output value provided by a supervisory host. Used when the mode is ROUT. Expressed in OUT_SCALE Unit Code.	
		1	R/W	ROUT_IN Status	
34	SHED_OPT	1	R/W	Define actions to be taken on remote control device timeout.	
35	RCAS_OUT	4	R	Block setpoint Value after ramping - provided by a supervisory host for back calculations and to allow action to be taken under limiting conditions or mode change. Used when mode is RCAS. Expressed in PV_SCALE Unit Code.	
		1	R	RCAS_OUT Status	
36	ROUT_OUT	4	R	Block output Value provided to a supervisory host for a back calculation to allow action to be taken under limiting conditions or mode change. Used when mode is ROUT. Expressed in OUT_SCALE Unit Code.	
		1	R	ROUT_OUT Status	
37	TRK_SCALE	4	R/W	High Range	All the values are associated with the external tracking value (TRK_VAL).
		4	R/W	Low Range	
		2	R/W	Unit Index	
		1	R/W	Decimal point	
38	TRK_IN_D	2	R/W	Discrete input used to initiate external tracking of the block output to the value specified by the TRK_VAL.	

Idx	Name	Byte	PC	Description	
39	TRK_VAL	4	R/W	This input is used as tack value when external tracking is enabled by TRK_IN_D. Expressed in TRK_SCALE Unit Code.	
		1	R/W	Tracking Status	
40	FF_VAL	4	R/W	The Feed-Forward Control Value. Expressed in FF_SCALE Unit Code.	
		1	R/W	The Feed-Forward Control Status.	
41	FF_SCALE	4	R/W	High Range	All the values are associated with the feed forward value (FF_VAL).
		4	R/W	Low Range	
		2	R/W	Unit Index	
		1	R/W	Decimal point	
42	FF_GAIN	4	R/W	The gain that the feed forward input is multiplied by before it is added to the calculated control loop.	
43	UPDATE_EVT			This alert is generated by any change to the static data.	
		1	R/W	Unacknowledged	
		1	R	Update State	
		8	R	Time Stamp: The date and time of when the alert was generated.	
		2	R	Static Revision	
		2	R	Relative Index	
44	BLOCK_ALM			The block alarm is used for all configuration, hardware, and connection failure or system problems in the block. The cause of the alert is entered in the sub-code field. The first alert to become active will set the Active Status in the status parameter. As soon as the Unreported status is cleared by the alert reporting task, another block alert may be reported without clearing the Active Status, if the sub-code has changed.	
		1	R/W	Unacknowledged	
		1	R	Alarm State	
		8	R	Time Stamp: The date and time of when the alert was generated.	
		2	R	Subcode	
		1	R	Value	

Idx	Name	Byte	PC	Description
45	ALARM_SUM			The summary alarm is used for all process alarm in the block. The cause of the alert is entered in the subcode field. The first alert to become active will set the Active Status in the status parameter. As soon as the Unreported status is cleared by the alert reporting task, another block alert may be reported without clearing the Active Status, if the subcode has changed.
		1	R/W	Current
		1	R	Unacknowledged
		8	R	Unreported
		2	R	Disabled
46	ACK_OPTION	2	R/W	Used to set auto acknowledgment of the alarms.
47	ALARM_HYS	4	R/W	Amount the PV must return within the alarm limit before the alarm condition clears. Alarm Hysteresis is expressed as percent of the OUT_SCALE span.
48	HI_HI_PRI	1	R/W	Priority of HI_HI_ALM
49	HI_HI_LIM	4	R/W	The setting of the High High Limit producing the High High Alarm. This value is expressed in OUT_SCALE Unit Code.
50	HI_PRI	1	R/W	Priority of HI_ALM
51	HI_LIM	4	R/W	The setting of the High Limit producing the High Alarm. This value is expressed in OUT_SCALE Unit Code.
52	LO_PRI	1	R/W	Priority of LO_ALM
53	LO_LIM	4	R/W	The setting of the Low Limit producing the Low Alarm. This value is expressed in OUT_SCALE Unit Code.
54	LO_LO_PRI	1	R/W	Priority of LO_LO_ALM
55	LO_LO_LIM	4	R/W	The setting of the Low Low Limit producing the Low Low Alarm. This value is expressed in OUT_SCALE Unit Code.
56	DV_HI_PRI	1	R/W	The Priority of DV_HI_ALM
57	DV_HI_LIM	4	R/W	The setting of the Deviation High Limit producing the Deviation High Alarm. This value is expressed in OUT_SCALE Unit Code.

Idx	Name	Byte	PC	Description
58	DV_LO_PRI	1	R/W	The Priority of DV_LO_ALM
59	DV_LO_LIM	4	R/W	The setting of the Deviation Low Limit producing the Deviation Low Alarm. This value is expressed in OUT_SCALE Unit Code.
60	HI_HI_ALM			High High Alarm data
		1	R/W	Unacknowledged
		1	R	Alarm State
		8	R	Time Stamp: The date and time of when the alert was generated.
		2	R	Subcode
		4	R	Value: The date and time of when the alert was generated.
61	HI_ALM			High Alarm data
		1	R/W	Unacknowledged
		1	R	Alarm State
		8	R	Time Stamp: The date and time of when the alert was generated.
		2	R	Subcode
		4	R	Value: The date and time of when the alert was generated.
62	LO_ALM			Low Alarm data
		1	R/W	Unacknowledged
		1	R	Alarm State
		8	R	Time Stamp: The date and time of when the alert was generated.
		2	R	Subcode
		4	R	Value: The date and time of when the alert was generated.

Idx	Name	Byte	PC	Description
63	LO_LO_ALM			Low Low Alarm data
		1	R/W	Unacknowledged
		1	R	Alarm State
		8	R	Time Stamp: The date and time of when the alert was generated.
		2	R	Subcode
		4	R	Value: The date and time of when the alert was generated.
64	DV_HI_ALM			Deviation High Alarm data
		1	R/W	Unacknowledged
		1	R	Alarm State
		8	R	Time Stamp: The date and time of when the alert was generated.
		2	R	Subcode
		4	R	Value: The date and time of when the alert was generated.
65	DV_LO_ALM			Deviation Low Alarm data
		1	R/W	Unacknowledged
		1	R	Alarm State
		8	R	Time Stamp: The date and time of when the alert was generated.
		2	R	Subcode
		4	R	Value: The date and time of when the alert was generated.
66	T1_RATE	4	R/W	Additional T1 time constant for the DT1 part.
67	BETA	4	R/W	Setpoint weight for the P part of the servo PID beta value.
68	GAMMA	4	R/W	The setpoint weight for the D part of the servo PID gamma value.

10.6 Temperature Transducer Block (only 267 / 269 transmitters)

Idx	Name	Byte	PC	Description
0	BLOCK_OBJ	62	mix.	In the Block Object data structure, there are different items describing the block characteristics. Execution period, Number of parameters in the block, the DD Revision, Profile Revision, View Objects characteristics and so on.
1	ST_REV	2	R	The revision level of the Static data associated with the Function Block. The revision level is incremented each time a static parameter value in the block is changed.
2	TAG_DESC	32	R/W	The user description of the intended application of the block.
3	STRATEGY	2	R/W	The strategy field can be used to identify grouping of blocks. This data is not checked or processed by the block.
4	ALERT_KEY	1	R/W	The identification number of the plant unit. This information may be used in the host for sorting alarms, etc.
5	MODE_BLK	1	R/W	Target - The selected mode from the operator.
		1	R	Actual - The mode the block is currently in.
		1	R/W	Permitted - Allowed modes that the target may take on.
		1	R/W	Normal - The common mode for the Actual.
6	BLOCK_ERR	2	R	This parameter reflects the error status associated with the hardware or software components associated with a block. It is a bit string, so that multiple errors may be shown.
7	UPDATE_EVT			This alert is generated by any change to the static data.
		1	R/W	Unacknowledged
		1	R	Update State
		8	R	Time Stamp: The date and time of when the alert was generated.
		2	R	Static Revision
		2	R	Relative Index

Idx	Name	Byte	PC	Description	
8	BLOCK_ALM			The block alarm is used for all configuration, hardware, connection failure or system problems in the block. The cause of the alert is entered in the subcode field. The first alert to become active will set the Active Status in the status parameter. As soon as the Unreported status is cleared by the alert reporting task, another block alert may be reported without clearing the Active Status, if the sub-code has changed.	
		1	R/W	Unacknowledged	
		1	R	Alarm State	
		8	R	Time Stamp: The date and time of when the alert was generated.	
		2	R	Sub-code	
		1	R	Value	
9	TRANSDUCER_ DIRECTORY	4	R	Directory that specifies the number and starting indices of the transducers in the transducer block.	
10	TRANSDUCER_ TYPE	2	R	Identifies the transducer type, always 101 = Standard Temperature with Calibration.	
11	XD_ERROR	1	R	Transducer block error sub-code	
12	COLLECTION_ DIRECTORY	36	R	Directory that specifies the number, starting indices, and the DD items IDs of the data collections in each transducer within a transducer block.	
13	PRIMARY_VALUE_ TYPE	2	R/W	Type of measurement representing the primary value. The default measurement type is 104 Process Temperature.	
14	PRIMARY_VALUE	4	R	This is the output value from the TB and input for the AIFB when CHANNEL = 1. It is always represented in the PRIMARY_VALUE_RANGE Unit-Index.	
		1	R	This is the output status from the TB.	
15	PRIMARY_VALUE_ RANGE	4	R	High Range	All the values are associated with the PRIMARY_VALUE. This record is read only and it is always a copy of the XD_SCALE of the AIFB having the Channel = 1. Whenever writing on XD_SCALE of the AIFB with CHANNEL = 1 are performed, the PRIMARY_VALUE_RANGE is updated in the same way. The usable units´ code is the same of the XD_SCALE in the Analog Input Function Block.
		4	R	Low Range	
		2	R	Unit Index	
		1	R	Decimal point	

Idx	Name	Byte	PC	Description		
16	CAL_POINT_HI	4	R/W	The Highest calibrated value.		
17	CAL_POINT_LO	4	R/W	The lowest calibrated value.		
18	CAL_MIN_SPAN	4	R	The minimum span to be used between the calibrations points, high and low.		
19	CAL_UNIT	2	R/W	Calibration Unit. Only Temperature Units are allowed.		
20	SENSOR_TYPE	2	R/W	Type of sensor. **Default is: 128 PT100 A 385.**		
21	SENSOR_RANGE	4	R	High Range	Sensor Temperature Unit. The allowed units are:	
		4	R	Low Range		
		2	R	Unit Index	**1000** Kelvin	**1002** Fahrenheit Degree
		1	R	Decimal point	**1001** Celsius Degree	**1003** Rankine Degree
22	SENSOR_SN	32	R	Serial Number of the sensor.		
23	SENSOR_CAL_ METHOD	1	R/W	Calibration Method		
24	SENS_CAL_LOC	32	R/W	The last location of the sensor Calibration.		
25	SENS_CAL_DATE	7	R/W	The last date on which the calibration was performed.		
26	SENS_CAL_WHO	32	R/W	The name of the person responsible of the last sensor calibration.		
27	SENSOR_ CONNECTION	1	R/W	The only possible value is: **4 Four Wire**		
28	SECONDARY_VALUE	1	R	Only for internal use.		
29	SECONDARY_ VALUE_UNIT	2	R/W	Only for internal use.		
30	MODULE_SN	4	R/W	Sensor Serial Number		
31	TTRB_ CHANNEL_MAP	2	R/W	This parameter is for the correlation of channels in a device to channels as defined for a plant or process area.		
32	COMP_WIRE	4	R/W	Only for internal use.		
33	TTRB_BIAS	4	R/W	Only for internal use.		
34	TTRB_MAX_ SENSOR_VALUE	4	R/W	Drag indicator for maximum temperature value. The drag indicator will be reset by writing any value.		
35	TTRB_MIN_ SENSOR_VALUE	4	R/W	Drag indicator for minimum temperature value. The drag indicator will be reset by writing any value.		

10.7 Multi Variable Block (only 267C / 269C transmitters)

The modification of the flow configuration (e. g. different primary device or medium) is only possible with the “Device Management Application” (DMA) for 267C / 269C transmitters. In this reason have parameter with influence to the flow calculation inside the Device Description a read only attribute.

Idx	Name	Byte	PC	Description
0	BLOCK_OBJ	62	mix.	In the Block Object data structure, there are different items describing the block characteristics. Execution period, Number of parameters in the block, the DD Revision, Profile Revision, View Objects characteristics and so on.
1	ST_REV	2	R	The revision level of the Static data associated with the Function Block. The revision level is incremented each time a static parameter value in the block is changed.
2	TAG_DESC	32	R/W	The user description of the intended application of the block.
3	STRATEGY	2	R/W	The strategy field can be used to identify grouping of blocks. This data is not checked or processed by the block.
4	ALERT_KEY	1	R/W	The identification number of the plant unit. This information may be used in the host for sorting alarms, etc.
5	MODE_BLK	1	R/W	Target - The selected mode from the operator.
		1	R	Actual - The mode the block is currently in.
		1	R/W	Permitted - Allowed modes that the target may take on.
		1	R/W	Normal - The common mode for the Actual.
6	BLOCK_ERR	2	R	This parameter reflects the error status associated with the hardware or software components associated with a block. It is a bit string, so that multiple errors may be shown.
7	DIFF_PRESSURE_IN	4	R	Differential pressure input. The differential pressure value.
		1	R	Differential pressure input. The differential pressure status.
8	DIFF_PRESSURE_ UNIT	2	R	Unit of all to the differential pressure belonging Values (Input, Range limits, Simulation values, Replacement value).
9	DIFF_PRESSURE_ DEFAULT	4	R	Differential pressure replacement value. Replacement value of the differential pressure. This value will be used by the flow calculation algorithm instead of the measured value if this option is selected (basically or at invalid input value).
10	PRESSURE_IN	4	R	Pressure input. The static pressure value (absolute).
		1	R	The static pressure status for flow calculation.
11	PRESSURE_UNIT	2	R	Pressure unit. Unit of all to the pressure belonging Values.

Idx	Name	Byte	PC	Description
12	PRESSURE_DEFAULT	4	R	Pressure replacement value. Replacement value of the pressure. This value will be used by the flow calculation algorithm instead of the measured value if this option is selected (basically or at invalid input value).
13	TEMPERATURE_IN	1	R	Temperature input. The temperature for flow calculation.
				The temperature status for flow calculation.
14	TEMPERATURE_ UNIT	2	R	Temperature unit. Unit of all to the temperature belonging Values.
15	TEMPERATURE_ DEFAULT	4	R	Temperature replacement value. Replacement value of the temperature. This value will be used by the flow calculation algorithm instead of the measured value if this option is selected (basically or at invalid input value).
16	DEFAULT_INPUT_ SELECT	1	R	Replacement values. Enables / Disables the basically use of a replacement value instead of a measured value.
17	OUT_VOL_FLOW	1	R	Volume flow output. Calculated volume flow in dependence of differential pressure, pressure and temperature.
18	OUT_VOL_FLOW_ UNIT	2	R/W	Volume flow unit. Unit of all to the volume flow belonging Values (Output, Maximum value, Simulation values). **ATTENTION!** If the unit will be changed then the belonging values must be adjusted.
19	OUT_MASS_FLOW	1	R	Mass flow / Normalized volume flow output. Calculated mass flow (Normalized volume flow at GAS) in dependence of differential pressure, pressure and temperature.
20	OUT_MASS_FLOW_ UNIT	2	R/W	Mass flow / Normalized volume flow unit. Unit of all to the mass flow/normalized volume flow belonging Values (Output, Maximum value, Simulation values). **ATTENTION!** If the unit will be changed then the belonging values must be adjusted.
21	SIMULATE_DIFF_ PRESSURE	1	R/W	SIMULATE dP Allows the input value to the block to be manually supplied when simulate is enabled. When simulate is disabled, the simulate value and status track the actual value and status.

Idx	Name	Byte	PC	Description
22	SIMULATE_ PRESSURE	1	R/?	SIMULATE P. Allows the input value to the block to be manually supplied when simulate is enabled. When simulate is disabled, the simulate value and status track the actual value and status.
23	SIMULATE_ TEMPERATURE	1	R/?	SIMULATE T. Allows the input value to the block to be manually supplied when simulate is enabled. When simulate is disabled, the simulate value and status track the actual value and status.
24	SIMULATE_VOL_ FLOW	1	R/?	SIMULATE volume flow. Allows the output value of the block to be manually supplied when simulate is enabled. When simulate is disabled, the simulate value and status track the actual value and status.
25	SIMULATE_MASS_ FLOW	1	R/?	SIMULATE mass flow / normalized volume flow. Allows the output value of the block to be manually supplied when simulate is enabled. When simulate is disabled, the simulate value and status track the actual value and status.
26	GRANT_DENY	1	R/W	Grant
		1	R/W	Deny
27	UPDATE_EVT	This alert is generated by any change to the static data.		
		1	R/W	Unacknowledged
		1	R	Update State
		8	R	Time Stamp: The date and time of when the alert was generated.
		2	R	Static Revision: The number of the last increment generating the alert.
		2	R	Relative Index: The index of the changed variable generating the alert.

Idx	Name	Byte	PC	Description
28	BLOCK_ALM			The block alarm is used for all configuration, hardware, connection failure or system problems in the block. The cause of the alert is entered in the subcode field. The first alert to become active will set the Active Status in the status parameter. As soon as the Unreported status is cleared by the alert reporting task, another block alert may be reported without clearing the Active Status, if the subcode has changed.
		1	R/W	Unacknowledged
		1	R	Alarm State
		8	R	Time Stamp: The date and time of when the alert was generated.
		2	R	Subcode: Cause of the alert
		2	R	Value: The value generating the alert.
29	ALARM_SUM			The alert status associated to the function block.
		2		Current
		2	R	Unacknowledged
		2	R	Unreported
		2	R	Disabled
30	DIFF_PRESSURE_ HI_LIM	4	R	Differential pressure range high limit. Upper working range limit of the differential pressure.
31	DIFF_PRESSURE_ LO_LIM	4	R	Differential pressure range low limit. Lower working range limit of the differential pressure.
32	PRESSURE_HI_LIM	4	R	Pressure range high limit. Upper working range limit of the pressure.
33	PRESSURE_LO_LIM	4	R	Pressure range low limit. Lower working range limit of the pressure.
34	TEMPERATURE_ HI_LIM	4	R	Temperature range high limit. Upper working range limit of the temperature.
35	TEMPERATURE_ LO_LIM	4	R	Temperature range low limit. Lower working range limit of the temperature.

Idx	Name	Byte	PC	Description
36	OUT_MASS_FLOW_ MAX	4	R	Maximum mass flow / Normalized volume flow. Maximum value of the Mass flow / Normalized volume flow. This value will be used to set the physical zero shift point. It represents the 100 % point.
37	OUT_VOL_FLOW_MAX			Maximum value of the volume flow.
38	ERROR_HANDLE_DP	1	R/W	BAD dP input handling. Selection of possibilities how the multivariable function block shall react if a needed input value is invalid (Status BAD-...).
39	ERROR_HANDLE_P	1	R/W	BAD P input handling. Selection of possibilities how the multivariable function block shall react if a needed input value is invalid (Status BAD-...).
40	ERROR_HANDLE_T	1	R/W	BAD T input handling. Selection of possibilities how the multivariable function block shall react if a needed input value is invalid (Status BAD-...).
41	MV_RESERVED_1	4	R	Only for use with DMA.
…	…	…	R	Only for use with DMA.
106	MV_RESERVED_66	32	R	Only for use with DMA.

11 Operating Modes

As defined by the FOUNDATION™ Fieldbus specifications, the Resource and Function Blocks have to satisfy defined operating modes each represented by a proper bit in the MODE_BLK_PERMITTED data structure.

The AIFB supports	The PID FB supports	The RB supports	The TB supports	The MV supports
- Manual (MAN)	- Manual (MAN)	- AUTO	- AUTO	- Manual (MAN)
- Automatic (AUTO)	- Automatic (AUTO)	- O/S	- O/S	- Automatic (AUTO)
- Out of Service (O/S)	- Out of Service (O/S)			- Out of Service (O/S)
	- IMAN (Initialisation Manual)			
	CAS (Cascade)			
	- RCAS (Remote Cascade)			
	- ROUT (Remote Output)			
	LO (Local Override)			

When the RB is Out of Service, all the other blocks are forced in Out of Service too.

12 Process Flow

The following Figures show the possible connections between the AIFBs and the variables in output from the Transducer Block.

12.1 Connection between AIFB and TB

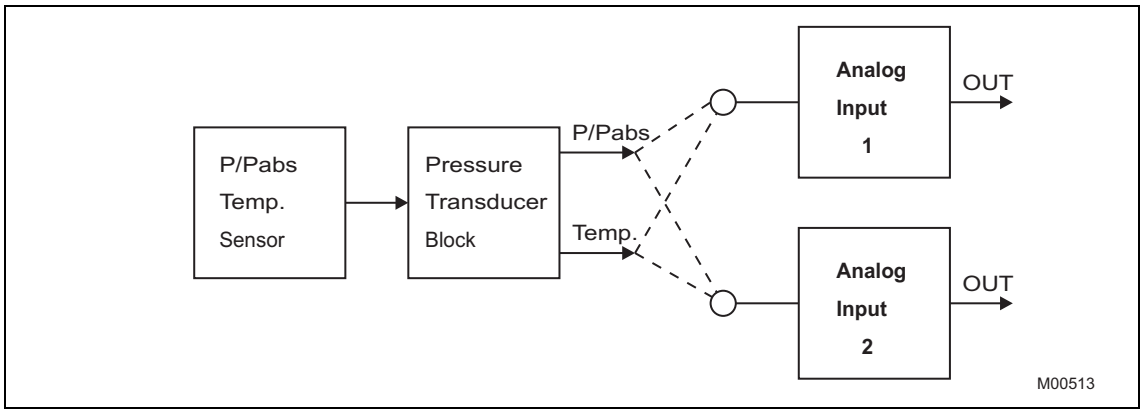


Fig. 11: Connection between AIFB and TB with 265Gx / 265Ax / 265VS for Gauge Pressure / Absolute Pressure

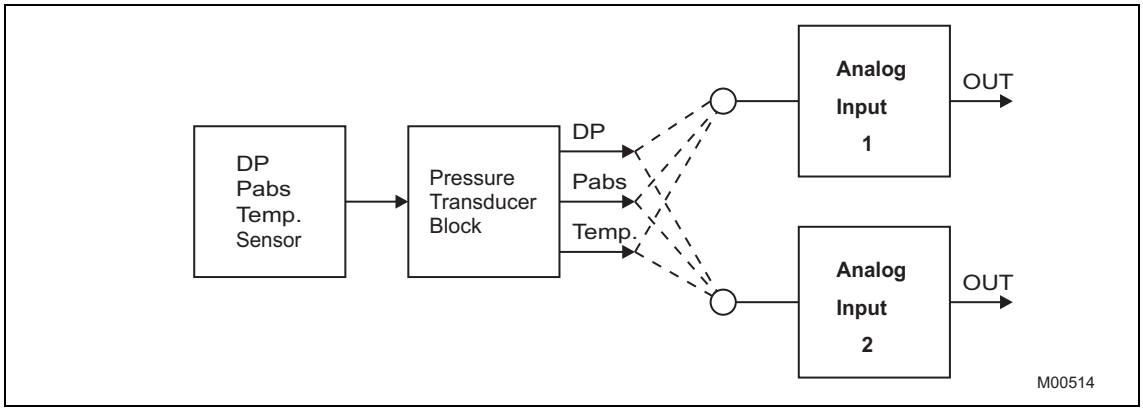


Fig. 12: Connection between AIFB and TB with 265Dx for Differential Pressure

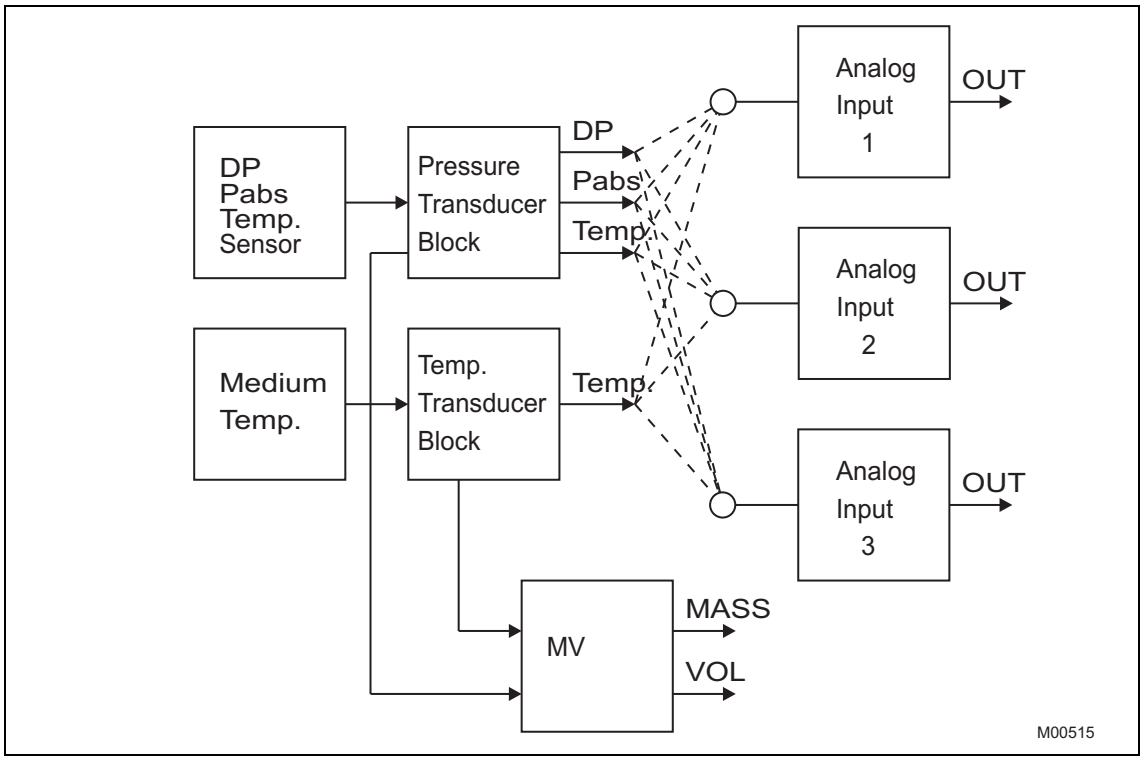


Fig. 13: Connection between AIFB and TB with 267 / 269 Multivariable Transmitter for Differential Pressure, Absolute Pressure, Temperature and Flow (MV Block, Mass- and Volume-Flow only with 267Cx / 269Cx)

The connection between Analog Input Block and Transducer Block will be made with choosing the same channel number for the CHANNEL parameter of the Analog Input Block and the PTRB_CHANNEL_MAP parameter of the transducer block. Two output values (E. g.: PRIMARY_VALUE and SECONDARY_VALUE) must always have different channel numbers.

The outputs for mass and volume flow are dedicated to the Multi Variable Function. These outputs can also be given to an Analog Input with choosing the channel 1001 or 1002.

12.2 Custom Pressure Transducer Block

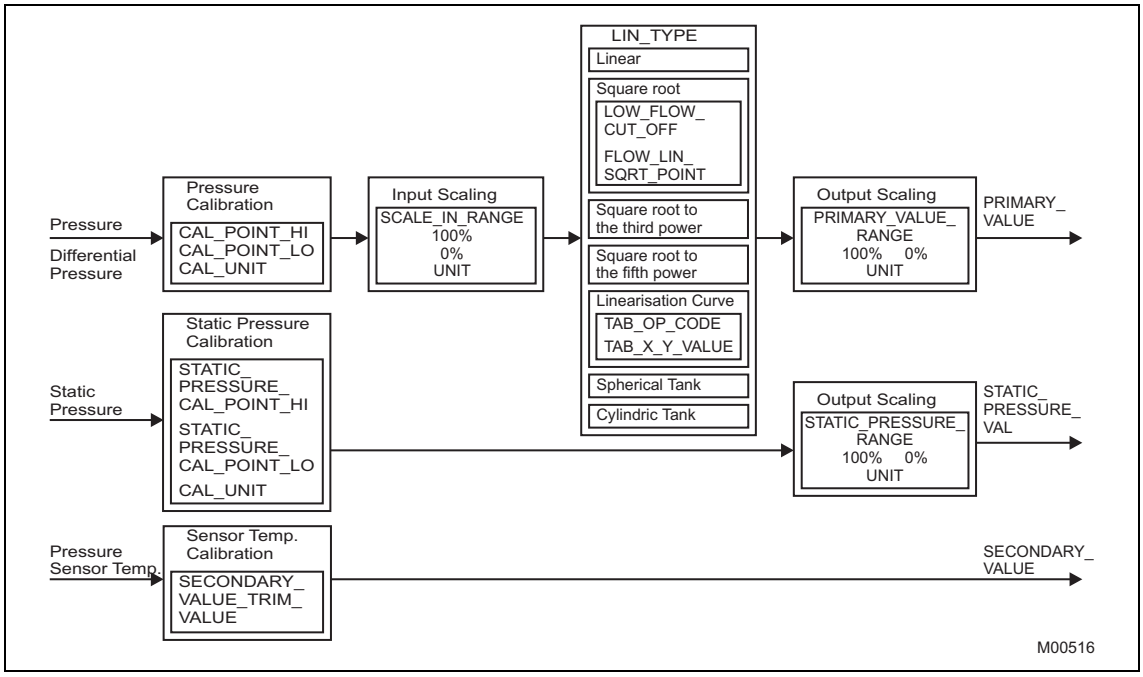


Fig. 14: Custom pressure Transducer block

12.3 Analog Input Function Block

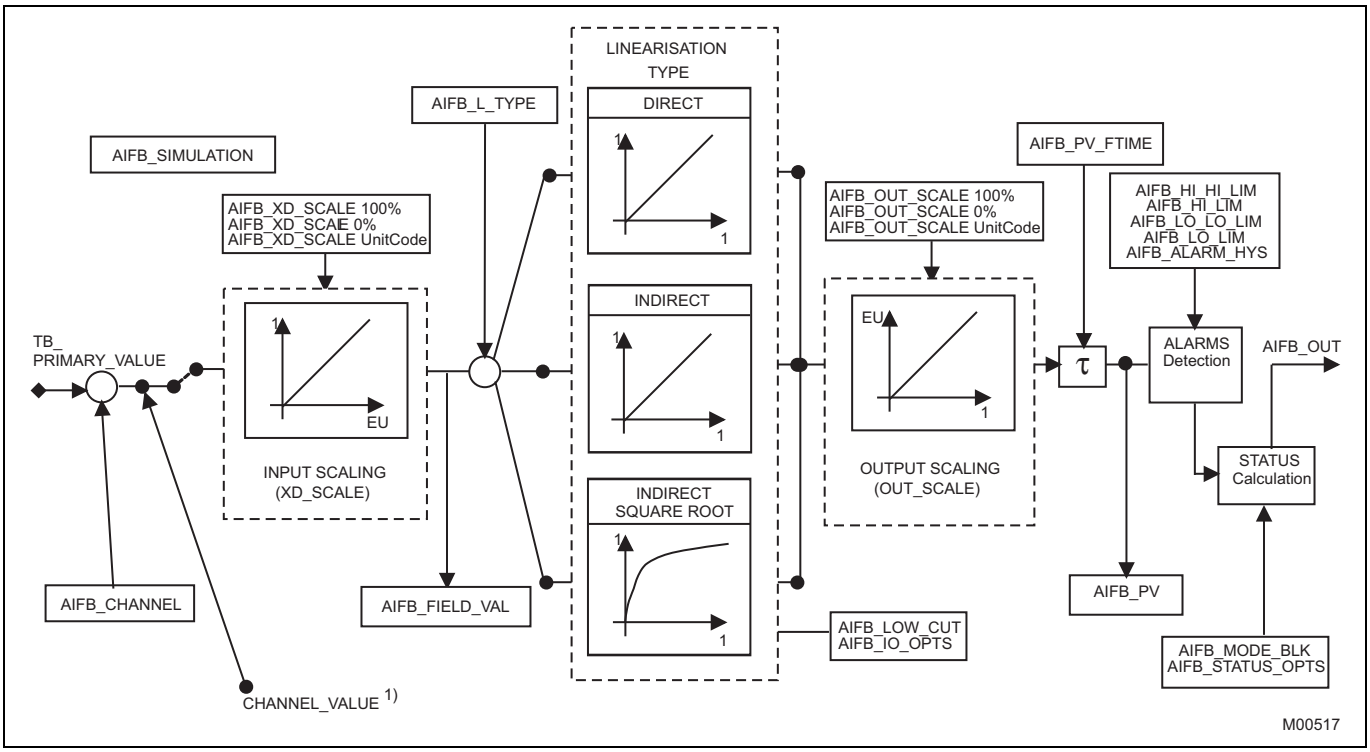


Fig. 15: Analog input function block

1) Depending by the channel selection, the AIFB input is one of the variables as in the table on Page 23.

12.4 PID Function Block

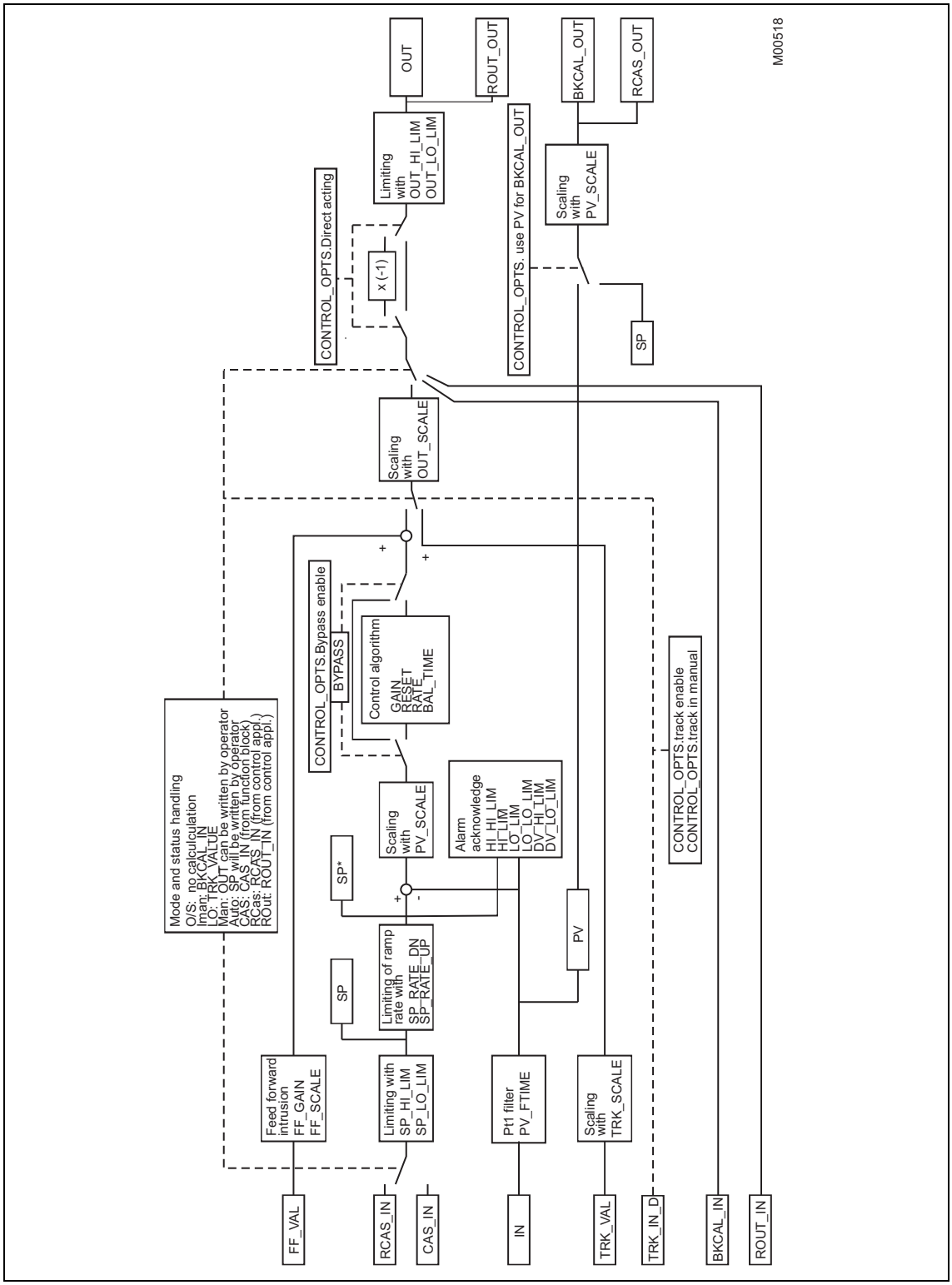


Fig. 16:

12.5 PID algorithm

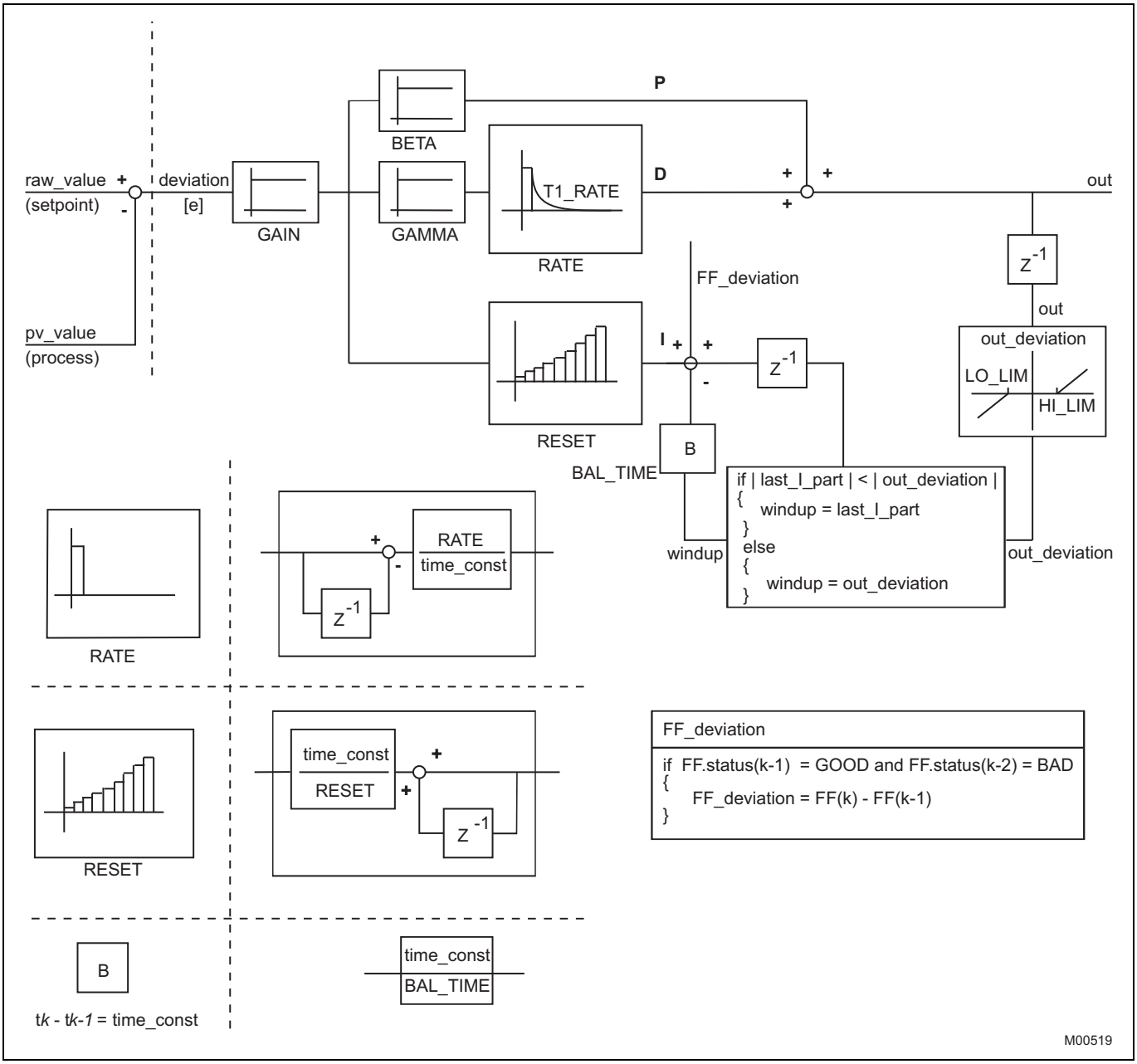


Fig. 17: PID algorithm

12.6 Custom Temperature Transducer Block

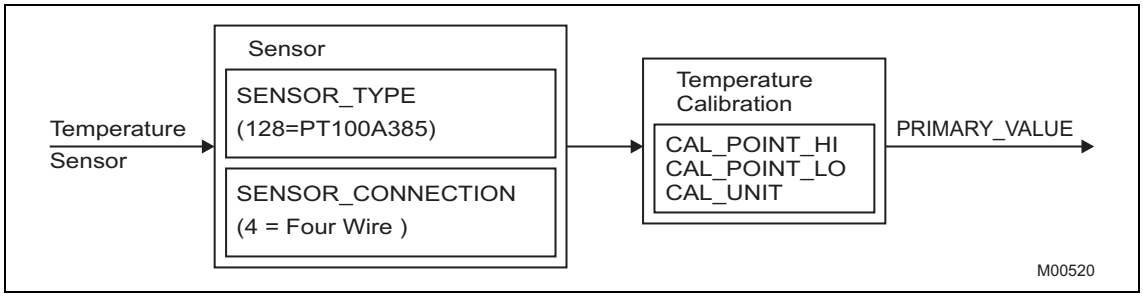


Fig. 18: Custom temperature transducer block

12.7 MV Block, flow calculation

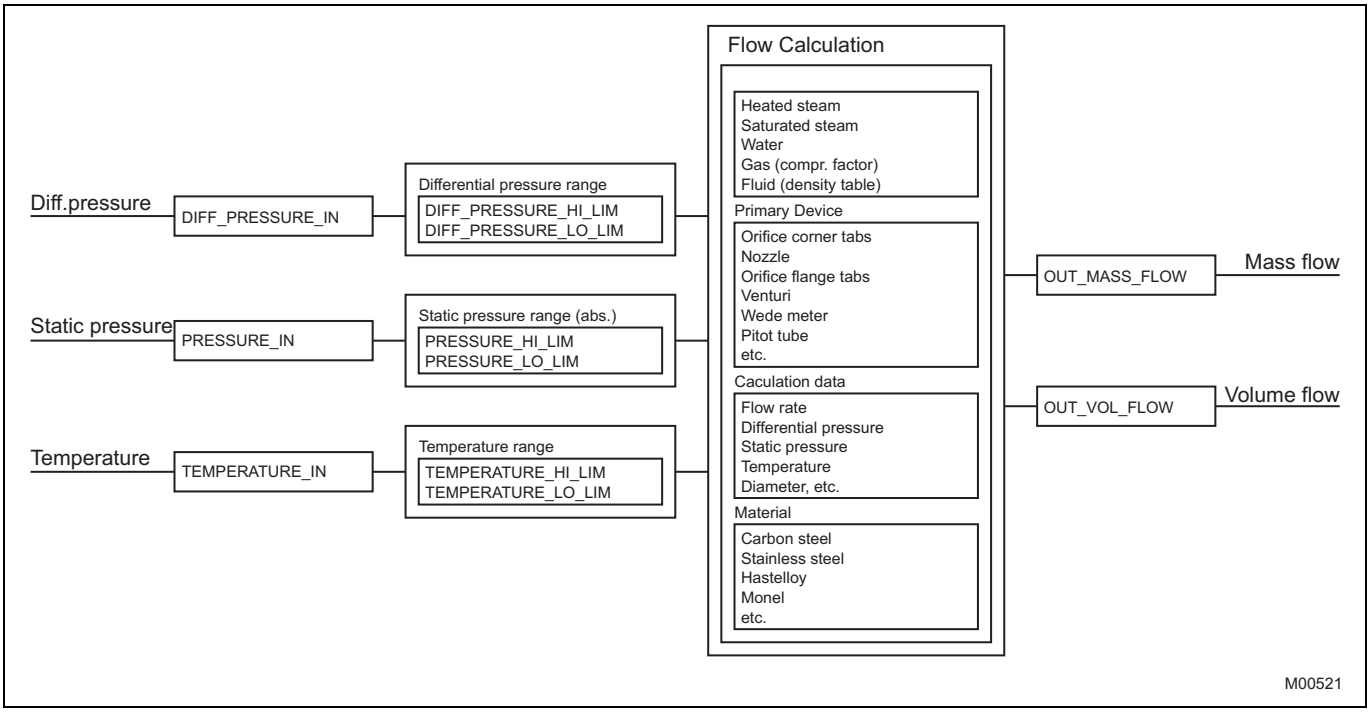


Fig. 19: MV block, flow calculation

12.8 Troubleshooting

Few considerations about the most common wrong conditions that make the device not properly working.

The AIFB or TB cannot be switched in AUTO mode

- Check that the RB must be in AUTO mode.

The AI Function Block has a BAD-Configuration Error in output

- Did you download the FB Application correctly?
- Check if the XD_SCALE setting is different by the OUT_SCALE setting. In this case, check that the L_TYPE is INDIRECT.
- Check if the CHANNEL, L_TYPE, are still set with the initial value that is not valid for the normal operations.

The PID Function Block cannot be switched in AUTO mode.

- Did you design and download the FB Application correctly?
- Set properly the SP value and status.
- Set with usable values the RATE, RESET, SHED_OPT, BY_PASS parameters.
- Check the status of the IN and BKCAL_IN, if BAD check the setting of the other blocks (AI, AO, …).

The PID Function Block cannot be switched in CASCADE mode.

- In addition, at the above checking, check also the status of the CAS_IN, if BAD check the setting of the CAS_IN source.

12.9 Status supported

The FOUNDATION™ Fieldbus defines different dynamic variables having the status byte to be produced together with the value. The status byte gives detailed information about the Quality of the associated variable's value. The following table lists the different status conditions available/generated for the output dynamic variables coming out from the AIFB, PIDFB and TB blocks[2] implemented in the 265 / 267 / 269 models of the 2600T Series. For each status condition is available a brief explanation about the meaning and an indication about into which block it is generated.

Status byte conditions supported in the Variables "AIFB_OUT, PID_OUT, TB_PRIMARY_VALUE"

		Quality		Substatus				Limits			Producer Block
Dec	Hex	Gr	Gr	QS	QS	QS	QS	Qu	Qu		
		2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0		
0	00		0	0						= bad	TB, AI, MV, PID
64	40	0	1							= uncertain	TB, AI, MV
128 192	80 C0	1 1	0 1							= good (Not Cascade) = good (Cascade)	TB, AI, MV, PID PID

Details for BAD

0	00	0	0	0	0	0	0			= non-specific	AI, MV, PID
4	04	0	0	0	0	0	1			= configuration error	AI
8	08	0	0	0	0	1	0			= not connected	PID
12	0C	0	0	0	0	1	1			= device failure	TB, PID
16	10	0	0	0	1	0	0			= sensor failure	TB
20	14	0	0	0	1	0	1			= no communication with LUV	PID**
24	18	0	0	0	1	1	0			= no communication no LUV	PID**
28	1C	0	0	0	1	1	1			= out of service	TB, AI, PID

Configuration error detail:

Set if the AIFB Channel is different by 0 but set to a not valid / supported value. See the Table on page 23 in this document for the supported Channel values.

Not Connected detail:

Set if this input is not referenced by a link object within the resource.

Device failure detail:

When malfunction in the device is detected this status is produced.

Sensor failure detail:

When malfunction of the sensor is detected, this status is produced.

No communication with last usable value (= LUV) detail:

Set if this value had been set by communication, which has now failed.

**Typically the Input variables of the PID are set to this status when the variable linked in input and coming from another block fails.

No communication, with no usable value detail:

Set if there has never been any communication with this value since it was last Out of Service.

**Typically, the Input variables of the PID are set to this status when the variable linked in input and coming from another block fails.

Out of Service detail:

This status is produced when the device is in Out Of Service mode.

When the TB_PRIMARY_VALUE_TYPE is selected for Flow and Volume measurement, some specific parameters of the Transducer block have to be well configured by the customer. If the configuration is not well done so the measure cannot be produced (i.e. negative value in input at the Square Root operation), this status is set.

When the XD_SCALE is set different to the OUT_SCALE and the L_TYPE is not set to indirect, this status is set.

2) Other variables like the Trimmed Value and the different SECONDARY_VALUE_x mapped in the TB, and several variables of the PIDFB are produced with their own status byte.

Details for UNCERTAIN

68	44	0	1	0	0	0	1			= Last Usable Value	TB
72	48	0	1	0	0	1	0			= substitute set	AI
76	4C	0	1	0	0	1	1			= Initial Value	TB
80	50	0	1	0	1	0	0			= sensor conversion not accurate	TB
84	54	0	1	0	1	0	1			= engineering unit range violation	TB

Last Usable Value (LUV) detail:

Whatever was writing this value has stopped doing so. (This happens when an input is disconnected by a configuration tool).

Substitute Set detail:

Set when the value is written when the block is not Out of Service.

Initial Value detail:

Set when the value of an input parameter is written when the block is Out of Service.

Sensor Conversion not Accurate detail:

This status is produced when the auxiliary values for compensation are not more usable (compensation sensors failed). The OUT will be always produced but with the last valid compensation. This gives an indication of degraded performances of the device.

Engineering unit range violation detail:

This status is produced when the value is outside the operating range selected for this variable.

Details for GOOD (non-cascade)

128	80	1	0	0	0	0	0			= ok	TB, AI, MV, PID
132	84	1	0	0	0	0	1			= active block alarm	TB, AI, PID
136	88	1	0	0	0	1	0			= active advisory alarm	AI, PID
140	8C	1	0	0	0	1	1			= active critical alarm	AI, PID
144	90	1	0	0	1	0	0			= unacknowl-edged block alarm	AI, PID
148	94	1	0	0	1	0	1			= unacknowl-edged advisory alarm	AI, PID
152	98	1	0	0	1	1	0			= unacknowl-edged critical alarm	AI, PID

Active Block alarm detail:

Set when the value is Good and the block has an Active Block alarm.

Active advisory alarm detail:

Set when the value is Good and the block has an Active alarm with priority less than 8.

Active critical alarm detail:

Set when the value is Good and the block has an Active alarm with priority greater than or equal to eight.

Unacknowledged Block alarm detail:

Set when the value is Good and the block has an unacknowledged Block alarm.

Unacknowledged advisory alarm detail:

Set when the value is Good and the block has an unacknowledged alarm with priority less than 8.

Unacknowledged critical alarm detail:

Set when the value is Good and the block has an unacknowledged alarm with priority greater than or equal to eight.

Details for GOOD (cascade)

192	C0	1	1	0	0	0	0		= ok	PID
196	C4	1	1	0	0	0	1		= initialisation acknowledge	PID
200	C8	1	1	0	0	1	0		= initialisation request	PID
204	CC	1	1	0	0	1	1		= non invited	PID
224	E0	1	1	1	0	0	0		= initiate fault state	PID

Initialisation Acknowledge detail:

The value is an initialised value from a source (cascade input, remote-cascade in, and remote-output in parameters).

Initialisation Request detail:

The value is an initialised value for a source (back calculation input parameters), because the lower loop is broken or the mode is wrong.

Not Invited detail:

The value is from a block, which does not have a target mode that would use this input. This covers all cases other than Fault State Active, Local Override, and Not Selected. The target mode can be the next permitted mode of higher priority in case of shedding a supervisory computer.

Initiate Fault State detail:

The value is from a block that wants its downstream output blocks (e.g. AO) to go to Fault State. This is determined by a block option to initiate Fault State is the status of the primary input and / or cascade input goes Bad. See the status option table.

Details for bits 'LIMITS'

+0	+00							0	0	= ok
+1	+01							0	1	= low limited
+2	+02							1	0	= high limited
+3	+03							1	1	= constant

If more than one condition is present, only the one with higher priority is reported. The priority level is in the following order:

BAD

GOOD (Cascade)

UNCERTAIN

GOOD (Not Cascade)

Into any single quality group, the priority level is relating to the value. (I. e. BAD - Out of Service is the higher priority and GOOD - OK is the lower priority)

13 Device Specification Data

The delivery of the models 265 / 267 / 269 FF includes the DD file (*.sym, *.ffo files) and the Capability file (.CFF file).

The following table is a summary of the most important models 265 FF specification data.

Manufacturer	**ABB**
Device Model	2600T Series Pressure Transmitter – Models 265 FOUNDATION Fieldbus
Device Type	Link Master Device
Measured Variable	Direct: Differential, Gauge, Absolute Pressure. Derived: Flow, Level and Volume
Output Signal	Physical layer compliant to the standard IEC 1158-2
Communication speed	31.25 Kbit/second
Electrical Signal	Manchester Code II
Power supply	Bus Powered: 10.2 … 32 Volts limited to 17 / 24 Volts for IS
Interface	FOUNDATION™ Fieldbus H1 Compliant with specification V 1.5
Blocks implemented	2 Standard Analog Input, 1 Standard PID, 1 Enhanced Resource, 1 Custom Pressure with Calibration Transducer Blocks
FB Execution period	80 ms for the AIFBs 100 ms for the PIDFB
LAS functionality	1 sub-schedule, 96 sequences, 25 elements for sequence
Number of link objects	25
Number of VCRs	24
Current consumption	12 mA
Fault Current limiting	19 mA
FF Registration	IT023700
IS Certificate	ATEX, FISCO
Max. Temperature	-40 … 85 °C
Remote Configuration tools	Via tools using DD & CFF Files

The following table is a summary of the most important models 267 / 269 FF specification data.

Manufacturer	**ABB**
Device Model	2600T Series Pressure Transmitter - Models 267 / 269 FOUNDATION Fieldbus
Device Type	Link Master Device
Measured Variable	Direct: Differential, Absolute Pressure, Temperature Derived: Flow, Level and Volume (Flow only with 267Cx / 269Cx)
Output Signal	Physical layer compliant to the standard IEC 1158-2
Communication speed	31.25 Kbit/second
Electrical Signal	Manchester Code II
Power supply	Bus Powered: 10.2 … 32 Volts limited to 17 / 24 Volts for IS
Interface	FOUNDATION™ Fieldbus H1 Compliant with specification V 1.5
Blocks implemented	3 Standard Analog Input, 1 Standard PID, 1 Enhanced Resource, 1 Custom Pressure with Calibration Transducer Blocks, 1 Temperature Transducer, 1 MV Block (only with 267Cx / 269Cx)
FB Execution period	80 ms for the AIFBs 100 ms for the PIDFB 100 ms for the MV (MV only with 267Cx / 269Cx)
LAS functionality	1 sub-schedule, 96 sequences, 25 elements for sequence
Number of link objects	25
Number of VCRs	24
Current consumption	12 mA
Fault Current limiting	19 mA
FF Registration	IT023600
IS Certificate	ATEX, FISCO
Max. Temperature	-40 … 85 °C
Remote Configuration tools	Via tools using DD & CFF Files, flow configuration with DMA

14 Reference

1. Function Block Application Process – Part 2.
   n° FF-891 – Revision 1.5 dated November 5, 2001.
2. Transducer Block Application Process Part 2.
   n° FF-903 – Revision PS 3.0 dated April 21, 1998.
3. Function Block Application Process – Part 1
   n° FF-890 – Revision 1.5 dated November 5, 2001.

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